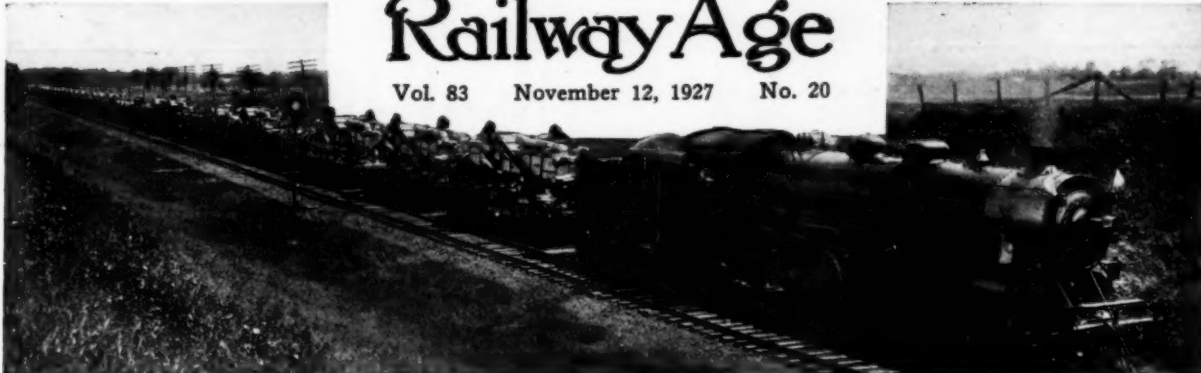


# Railway Age

Vol. 83 November 12, 1927 No. 20



A Train Load of Case Threshing Machines on the C. & N. W. Near Racine, Wis.

## Contents

### The Lighting of Railroad Yards.....Page 922

H. E. Mahan and R. J. Swackhamer, of the Illuminating Engineering Laboratory, General Electric Company, Schenectady, N. Y., discuss an outline of floodlighting requirements.

### The Possibilities of the Rail Motor Car ..... 929

Gen. A. Guidoni, air attache, Italian Embassy, London, Eng., presents a theoretical discussion of high speed railway vehicle.

### Comprehensive Plan Outlined for Railways Owning Ships..... 950

Edward N. Hurley, formerly chairman of the Shipping Board, believes railways should engage in ocean transportation and his ideas are presented.

#### EDITORIALS:

Yard Power Utilization .....	917
Faster Speeds in Rail Transportation .....	917
Motor Transport Growth Arouses Public Concern.....	917
Advertising Possibilities in Timetables.....	918
More Action Needed .....	918
A Mechanical Department Opportunity .....	918
Railroad Equipment Buying .....	919
Regulation in "Analogy to Government Ownership" .....	920
Railway Grading Development .....	921

#### GENERAL ARTICLES:

The Lighting of Railroad Yards .....	922
Discrimination Against Intrastate Commerce Not Within Jurisdiction of I. O. C. ....	925
Passenger Men Meet in Havana .....	926
Freight Car Loading .....	928
The Possibilities of the Rail Motor Car.....	929
Great Northern Valuation .....	932
Union Pacific Receives Eight New Observation Cars.....	933

#### GENERAL ARTICLES—Continued

Report on Gallitzin Derailment .....	935
S. P. Handles Record Tonnage .....	935
Rate Regulation and Capital Requirements.....	936
New Coal Station Has 2,400 Tons Storage Capacity.....	939
The Protection of Men Working Under Traffic.....	940
Pennsylvania Supply Departments Occupy New Quarters.....	941
New Depreciation Hearings Begin .....	943
Disastrous Floods in New England .....	945
I. C. C. Bureau of Safety Reports on Transverse Fissures.....	947
Comprehensive Plan Outlined for Railways Owning Ships.....	950
Railroads Complete Evidence in Firemen's Wage Hearing.....	952

#### COMMUNICATIONS AND BOOKS..... 954

#### LOOKING BACKWARD ..... 955

#### ODDS AND ENDS OF RAILROADING..... 955

#### NEWS OF THE WEEK..... 956

Published every Saturday by the

Simmons-Boardman Publishing Company, 30 Church Street, New York

EDWARD A. SIMMONS, *President*

L. B. SHERMAN, *Vice-Pres.*

HENRY LEE, *Vice-Pres. & Treas.*

SAMUEL O. DUNN, *Vice-Pres.*

F. H. THOMPSON, *Vice-Pres.*

C. R. MILLS, *Vice-Pres.*

ROY V. WRIGHT, *Sec'y.*

CHICAGO: 106 West Adams St.

WASHINGTON: 17th and H Sts., N. W.

NEW ORLEANS, MANDEVILLE, LA.

CLEVELAND: 6007 Euclid Ave.

SAN FRANCISCO: 74 New Montgomery St.

#### Editorial Staff

SAMUEL O. DUNN, *Editor*  
ROY V. WRIGHT, *Managing Editor*  
ELMER T. HOWSON, *Western Editor*  
H. F. LANE, *Washington Editor*

B. B. ADAMS  
C. B. PECK  
W. S. LACHER  
C. W. FOSS  
ALFRED G. OEHLE  
F. W. KRAEGER  
E. L. WOODWARD  
J. G. LYNE

J. H. DUNN  
D. A. STEEL  
R. C. AUGUR  
R. A. DOSTER  
JOHN C. EMERY  
MARION B. RICHARDSON  
L. R. GURLEY  
H. C. WILCOX

R. S. KENRICK  
NEAL D. HOWARD  
F. M. PATTERSON  
RICHARD W. BECKMAN  
LLOYD GEORGE  
CHARLES LAYNE  
GEORGE E. BOYD

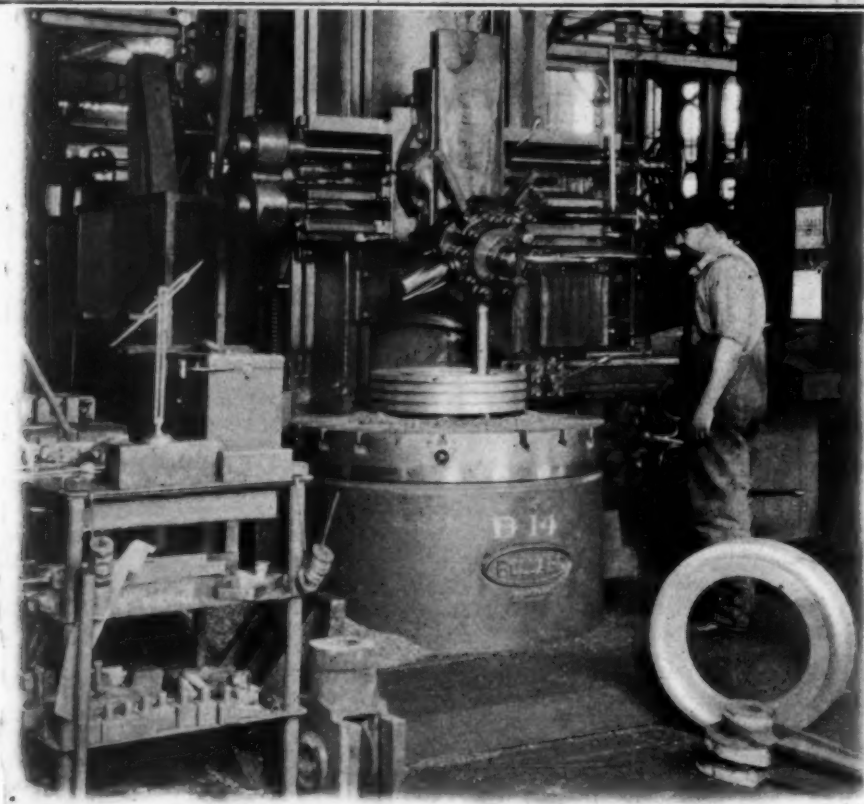
The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free; United States, Mexico and Canada, \$6.00. Foreign countries, not including daily editions, \$8.00.

Subscriptions for the fourth issue each month only (published in two sections, the second of which is the Motor Transport Section) payable in advance and postage free; United States, Mexico and Canada, \$1.00; foreign countries, \$2.00. Single copies, 25 cents each.

## The High Bed 54" Vertical Turret Lathe



## Pays Big Dividends

**T**HE savings insured by the above illustrated BULLARD justify its installation in every large railroad shop.

It's the High Bed 54" Vertical Turret Lathe which has cut machining costs on cylinder bushings over 50% and maintains the well known BULLARD production time on all other Vertical Turret Lathe jobs. It has solved an unusually awkward machining problem in one set-up—a job that formerly required two big units.

When caught up on cylinder bushings, it can be quickly converted into a standard high speed Vertical Turret Lathe. To be brief it's an extra size BULLARD capable of handling extra sized jobs and returning extra sized profits.

The Bullard Machine Tool Company  
Bridgeport, Conn. U. S. A.

**BULLARD** **VERTICAL**  
**TURRET LATHES**

*"A Reputation Built on Performance"*

# Railway Age

Vol. 83, No. 20

November 12, 1927

Table of Contents Appears on  
Page 5 of Advertising Section

## *Yard Power Utilization*

**T**HE percentage of utilization secured with locomotives in yard and terminal switching service depends on many physical factors and conditions, a comprehensive understanding of which is essential to any fair comparison of operations at different points. The accomplishments of the best located and equipped yard on any railroad usually cannot be duplicated by other yards on the same road, but may well serve as a mark at which the others can shoot. Such a mark, and one of the best records yet obtained in locomotive utilization, is that established at a busy yard in the Middle West in which triple-crewed switching locomotives are being operated as many as 720 out of the possible 744 hours in a 31-day month, one 24-hour period being required for the regular monthly inspection and boiler wash-out. A maximum utilization of 96.8 per cent is thus achieved. Five locomotives at this yard spend an average of 32.6 min. once a day at the ash pit for inspection and supplies and are in actual service 92.5 per cent of the calendar month. Fuel economy goes hand in hand with utilization and these locomotives, assigned to heavy train yard service, average only 118 lb. of coal per engine-mile. Results such as these demonstrate clearly what can be done when a proper appeal is made to the interest, loyalty and co-operative spirit of local terminal officers and employees.

## *Faster Speeds in Rail Transportation*

**A**PPEARING elsewhere in this issue is an article by Gen. A. Guidoni, air attaché to the Italian Embassy, London, England, in which he discusses the possibilities of attaining speeds in rail transportation as high as 125 m.p.h. Much of what he says is the result of studying available resistance data on steamships, automobiles and steam trains in the light of modern aeronautical science. His selection of a motor rail car having a stream-lined body and equipped with gyroscopes and tailfins is to obtain a rail vehicle, the design of which seems to adapt itself the most readily to lowering the weight and the air resistance to the same relative proportions as for aircraft. The questions of both atmospheric and frictional resistance on locomotives and trains has engaged the attention of a large number of investigators for many years. Greater progress, however, has been made in reducing the resistance due to friction (witness the rapid development in roller bearings for cars) than in reducing atmospheric resistance. Although much admirable work has been done in connection with the latter problem during the past 25 years, it has been quite sterile in results, and in spite of the fact that railways have been in existence for over a century, most of the locomotives and passenger cars are still designed without much thought being given to atmospheric resistance. The situation today is, as Gen. Guidoni brings out in the introductory paragraph of his article, that marked progress has been made by the railroads toward in-

creased locomotive capacity and travel comfort, but progress with respect to speed has not been nearly so great. Although his proposed design of motor rail car seems to be somewhat of a fantasy, there are these facts that the reader must take into consideration. Atmospheric resistance absorbs something like one-half the power of a train going 60 m.p.h. and over. Competition with highway and air traffic will probably increase the desirability of higher speeds in rail passenger transportation. A new and valuable ally has appeared in the form of aeronautical research and the assistance which it can lend in the solving of the problems of higher speeds should not be ignored.

## *Motor Transport Growth Arouses Public Concern*

**E**



## Advertising in Timetables

THE timetables issued by the railways for free distribution to the public are expensive and, if they are merely timetables, constitute an expense which is out of proportion to the returns in revenue that they directly cause. Nevertheless, timetables have to be published and distributed in response to the demand for them, whether expensive and a factor in attracting business or not. The net loss from the publication of timetables, however, can be considerably if not entirely mitigated if they are utilized as a medium for real selling talk on the various features of the railways' service. This is being done to a large extent by a number of the railways and to a smaller extent by most of the others. Only a few, however, have taken the fullest possible advantage of this means of getting effective advertising of their service in the hands of prospective patrons at a very slight expense. Extensive space in the timetable can well be given to the advertising of new and improved passenger train service. Freight service advertising, with which the railways have done comparatively little, might also be featured to advantage. One or more pages in the timetable could be put to good use by devoting them to institutional advertising or public relations material of the sort that many railways now disseminate through paid advertising in newspapers and magazines. The services rendered by industrial and agricultural departments, the attractions of vacation spots served by the railways, and other subjects now referred to in more or less railway advertising, might also be given treatment in the timetables. The additional cost involved in preparing such advertising and in making a place for it in the timetables by the addition of a few pages is very small. It offers an opportunity for inexpensive advertising of the most effective sort.

## More Action Needed

TAKING the investigation of the disastrous accident on the St. Louis-San Francisco near Victoria, Miss., on October 27, 1925, as a basis, James E. Howard, engineer physicist of the Bureau of Safety of the Interstate Commerce Commission, has presented an extended review of his investigations of transverse fissures in a report which has just been issued by the commission and which is abstracted on another page in this issue. In this report Mr. Howard reiterates, in the main, the conclusions which he has espoused at intervals since he first undertook the active study of this form of rail failure following the Manchester, N. Y., wreck on the Lehigh Valley in 1911. In particular he again places the responsibility for the formation of transverse fissures on conditions inherent in the service to which the rails are subjected in track. This position is and has long been challenged by the railways, which have contended that they result in part or entirely from some as yet unascertained deficiency in mill practice for which they hold the rail manufacturers responsible. They have not yet, however, been able to support their contention with conclusive proof, nor have they been able to demonstrate the error of Mr. Howard's conclusions. They are, therefore, and have been for years, on the defensive in this controversy.

The transverse fissure is essentially a problem of the railways, for it is they who suffer from it. It is their responsibility, therefore, more than that of any other party to ascertain its cause and determine ways to eliminate it. This they have not yet done, although this menace to railway operation has now been recognized

and discussed for sixteen years. It is a particularly dangerous defect because of the fact that up to the present time no means of detecting it in advance of failure has been found. It is true that within recent weeks a device for the detection of fissures which has shown much promise in the laboratory has been subjected to road tests, but its effectiveness in the field remains to be proved. Furthermore, if successful, this device will only indicate the location of fissures after they are formed and will not eliminate the causes contributing to them.

This situation is one that cannot be viewed with complacency. The hazard of the transverse fissure is obvious. Its control and elimination constitute a challenge to the metallurgical talent of the railways which demands more attention than it is now being given.

## A Mechanical Department Opportunity

THE statement was made, in a recent report of the Car Service Division, that in its opinion the business of the country for some time to come, could be handled with 100,000 less box and open top cars, provided in part that there be a continuation of the present plan of maintaining equipment in the best possible condition, and that there be a further increase on one mile per day in average car mileage. The success of many roads in extending locomotive runs has been due to an elevation in the standard of maintenance which has been brought about, to a large extent, by more thorough inspection and a schedule of periodical repairs. The greater utilization of locomotives in this manner has resulted in an increase in average daily locomotive mileage. Should not the same basic principles contribute to an improvement in the car utilization situation? T. W. Demarest, general superintendent motive power, Western Region, Pennsylvania, pointed out in his address before the International Railway General Foremen's Association convention, that past practice has limited car movements, so far as reinspection and repair work is concerned, to division or crew changing terminals and that by comparison with locomotives, the freight car receives relatively poor inspection and infrequent overhauling. He also said, that there appeared to be no new principles involved in this problem and that the causes for car delays and their remedy were in full view. The energy of the mechanical department has for some time past been directed primarily toward locomotive maintenance and operation while apparently relatively little real study has been given to car maintenance and operation. When it is considered that were it necessary for Class I roads to maintain 100,000 less cars there would be a resulting saving of about 19 million dollars annually in maintenance expense, not to mention the important factor of a reduction in capital investment in freight cars, it would seem that the solution of the problem of getting more out of our freight cars should constitute one of the greatest present opportunities for the mechanical department to contribute to a continuance of the remarkable increase in operating efficiency and earning ability of the railroads. But, as Mr. Demarest pointed out, the solution may mean a change in policy and methods and, above all, concerted action on the part of all roads. A high standard has already been set up and must be excelled. Some roads have exceeded an average car mileage of 50 miles a day, while many have exceeded 40 miles a day. Since better inspection and improved maintenance are necessary for further increases, there



should be no doubt on the part of those responsible for the care of rolling stock as to where to direct their attention during the next few years.

## Railroad Equipment Buying

A WIDESPREAD and animated discussion of the railroad equipment situation has been started by a letter recently written by Alba B. Johnson, president of the Railway Business Association, to members of that organization, which was published in the *Railway Age* of November 5, pages 903-904. Railroad orders for both locomotives and freight cars have been below the average for about two years. Meantime adequate railway service has been rendered and substantial surpluses of equipment have been maintained. But Mr. Johnson, in his letter, gave reasons why he believes there is danger of a shortage of equipment in 1928.

A full and frank consideration and discussion of the policy—or lack of policy—followed by the railroads in buying equipment would be healthy, and we hope Mr. Johnson has started it. It is doubtful if there are any other classes of manufacturers in the United States whose business is subject to wider fluctuations than that of the builders of railway locomotives and cars. Statistics of the Interstate Commerce Commission regarding installations and retirements of locomotives and cars are available for the twenty years ending with 1926, while statistics of the American Railway Association are available for the first nine months of 1927. During the ten years ended on June 30, 1916, the installations of locomotives averaged 2,893 annually, and varied from a maximum of 4,381 in 1913 to a minimum of 1,114 in 1915. The minimum, it will be seen, was only about one-fourth as great as the maximum. In the ten years ending with 1926 average annual installations were less, being 2,109. The fluctuations, however, were equally wide, being from 4,360 in 1923 to 1,017 in 1920.

The fluctuations in the installations of freight cars have been similar. In the ten years ending with 1916 they averaged 127,822 annually, reaching their maximum of 192,896 in 1907 and almost immediately dropping to their minimum of 67,925 in 1908. During the ten years ending with 1926 installations of freight cars averaged 109,569, and varied from 232,060 in 1923 to only 36,044 in 1920.

The fluctuations in the retirements of equipment have been hardly less extreme. In the decade ending with 1916 retirements of locomotives averaged 1,557 annually and varied from 2,576 in 1916 to only 36 in 1907. In the decade ending with 1916 they averaged 1,995 annually and varied from 3,746 in 1923 to 977 in 1918.

In the decade ending with 1916 retirements of freight cars averaged 76,306 annually and varied from 109,996 in 1916 to 1,541 in 1907. In the decade ending with 1926 they averaged 99,784 annually and varied from 213,780 in 1923 to 43,274 in 1919.

We hear some equipment manufacturers say that their business within the last two years, and especially thus far in 1927, has been the worst in history. Measured by the number of locomotives and cars reported as installed this is an exaggeration. The number of locomotives installed in 1926 was 1,881. This was less than the average for the last ten years, but greater than in four years of the last decade and than in seven years of the last two decades. Installations of locomotives during the first nine months of 1927 were 1,476, or, roughly speaking, at the annual rate of 1,968 as compared with the average during the preceding ten years of 2,109.

Installations of freight cars in 1926 were 92,894. This was less than the average for the decade which

ended last year, but greater than in four years of that decade and greater than in seven years of the last twenty. Installations of freight cars during the first nine months of 1927 were almost 55,000, or, roughly speaking, at the annual rate of 73,000. If this should be the number of cars installed during the year it would be the smallest year's installations in the last twenty years, excepting in 1909, 1918, 1920 and 1921, and would be about 45,000 cars, or approximately 40 per cent, less than the average annual installations of the preceding decade, and about 80 per cent less than maximum installations in 1923.

The builders of equipment, and especially freight cars, are not complaining at present merely about the comparatively small amount of equipment being bought. They are also complaining about the increasing tendency of the railways to build and rebuild equipment in their own shops and thereby deprive the manufacturers of even more business than they would lose by a decline only in installations of equipment.

There can be no reasonable question as to the reasons for the comparatively small amount of equipment the railways recently have been acquiring. There has been an extraordinary increase in the efficiency of use of equipment, and this has resulted in substantial surpluses being maintained even when a record-breaking traffic has been moving. The situation during most of the last two years has been unusual, however, in one respect. Formerly it was the almost unvarying practice of the railways to place maximum orders for equipment when a record-breaking traffic was being handled and earnings were large. A record-breaking traffic was handled in 1926, however, and the net return earned was the largest since the war, and yet purchases of equipment were less than the average. Undoubtedly in 1927 any disposition that the railways might otherwise have had to increase purchases of equipment has been curbed by the declines of traffic and net earnings and unfavorable developments in government regulation.

The facts regarding the great fluctuations that always have occurred in the acquisition of equipment make only too plain that there is need for a real and lasting change in the equipment buying policy of the railways. Those of them that are increasing the building and rebuilding of equipment in their own shops give as their principal reason that they can do it more economically. This is very questionable. No facts have ever been made public to substantiate it. Even, however, if it were true the facts regarding the positively enormous past fluctuations in installations of equipment would help to furnish an explanation. Obviously the manufacturers of equipment could not build it with maximum economy when, within a single decade, annual installations of locomotives fluctuated from a minimum of 1,017 to a maximum of 4,360, and annual installations of freight cars fluctuated from a minimum of 36,000 to a maximum of 232,000. Furthermore, the fluctuations in traffic never have warranted the enormous fluctuations that have occurred in annual installations and retirements of equipment. On the contrary, the extreme fluctuations in equipment installations and retirements repeatedly have contributed to causing shortages of facilities when traffic increased and surpluses of facilities when traffic declined.

There is an obvious need from the standpoints of the railways, the equipment builders and general business for a concerted and constructive effort to stabilize purchases of railway equipment. The wide fluctuations in these purchases that always have occurred and are still occurring aggravate the equipment shortages and surpluses of the railways, demoralize the equipment building industry and increase the cost of conducting it, and help to intensify undesirable fluctuations in general business activity.

## Regulation in "Analogy To Government Ownership"

THE brief presented to the United States District Court by counsel of the Interstate Commerce Commission in the O'Fallon railway valuation case is a most significant document. It illustrates how radical is the position the commission has taken by showing the extreme length to which its lawyers have been driven to find theories and arguments with which to defend it.

As already has been pointed out in these columns (see editorial "The Defense of the Commission," *Railway Age*, October 15, page 707), counsel for the commission in their argument in court contended that railroads perform a function of government, and therefore are not private property in the ordinary sense and are not entitled to the same constitutional protection from confiscation as other privately owned property. In their brief they show the most important conclusion they draw from this premise by asking: "Must we not get back to the fundamental principles \* \* \* that railroads are private property only in the sense that the title is held in private ownership, but that the investment, whether in money or in property, is 'dedicated' to the performance of a 'governmental function' and is to be treated as nearly as may be as if the government itself had made the investment and had issued and sold to private parties the securities representing that investment." They then add: "The exercise of a governmental function by a private agency can only be justified and continued if we enforce with practical wisdom the closest practicable analogy to government ownership and operation."

There can be no question about what that means. The government, acting for the public, did not see fit to build the railways and raise, by the sale of its bonds, the capital therefor. If the government had done so it would not expect or ask to be allowed to earn a return on a valuation in excess of its actual investment; and therefore, the private owners of capital who have made the investment have no constitutional right to receive a return on a valuation exceeding the number of dollars they have invested. There may and do occur increases in the value of all other kinds of property in excess of the investment made in it, by which its owners benefit; but on this theory it would be unconstitutional to allow and recognize any such increases in the value of railroad property.

This reasoning necessarily leads to another conclusion which neither the commission nor its counsel have yet stated. If the government had built the railways it might not have had to pay more than 4 per cent interest on the bonds issued by it to raise the capital. If it now owned them it might be able to raise at even less than 4 per cent interest the capital required to make needed enlargements and improvements in railroad property in future. Therefore, pursuing the analogy of government ownership, not only could the government make a valuation that would entirely disregard the difference between what the railways have cost and what it would cost to reproduce them now, but it could also constitutionally restrict them to 4 per cent or less on the valuation made.

### Why Private Ownership?

Why did not the government construct the railways? Why did it not acquire them on one of the many occasions when the adoption of government ownership has been advocated? For example,

when it was operating them in 1919, why did not Congress pass a law for their acquisition? For the well-known reason that private ownership and operation has been believed by the public to be sound public policy. Why have many billions of privately owned capital been invested in the railways? Because it has been assumed from the beginning of railway construction that private capital invested in railways would be accorded the same protection from confiscation as other property, and, because, after regulation of rates began to be adopted, the courts, in a series of decisions extending over a period of 35 years, held that this expectation was justified and must be fulfilled. When, therefore, the commission, through its lawyers, now contends that government regulation should enforce "the closest practicable analogy to government ownership and operation," it contends, after a century of railroad development, for a policy the exact opposite of that which the courts have heretofore held must be followed and which investors in railway securities heretofore have relied upon in making their investments.

The argument based by the commission's counsel on its theory of "analogy to government ownership" in defense of the method of valuation adopted by the commission is a curiosity in its self-destructiveness. They say that to make now a valuation which would give effective weight to present cost of reproduction would be wholly impracticable because it would be impossible to make any rational estimate of present cost of reproduction. They argue, as the commission did in its opinion in the O'Fallon case, that a "prudent investment" valuation would not only be more fair to both the public and the railways, but could be easily made. They then find themselves confronted by an amusing dilemma. The commission repeatedly has stated that it cannot ascertain the actual investment, "prudent" or otherwise, in most railways. Therefore, it says, its valuation of the part of the properties that existed in 1914 is based on their estimated cost of reproduction as of that date, which it believes at that time approximated the "prudent investment." Here, then arises the following question: "If it would be utterly impracticable to make in 1927 a rational estimate of the cost of reproduction of railway property at the unit costs that have prevailed since the war, how can it be practicable to make in 1927 a rational estimate of what it would have cost in 1914 to reproduce railway property at the unit cost that prevailed before the war?" This pertinent and highly significant question the commission has not attempted to answer. Nor do its lawyers. Having hotly contested the practicability of making any reasonable estimate of the cost of reproduction at post-war costs, they find it convenient to ignore the fact that this constitutes an attack on the very method the commission itself says it has followed in making a valuation of all railway property as of 1914!

### Is Commission Sole Judge of Valuation?

On what do the commission and its lawyers really contend a valuation should be based? Having argued for the "prudent investment" basis at length, they suddenly repudiate it by saying that the commission actually has not adopted it; that they recognize that the rule of the courts that present "fair value" must be determined is still in effect; and that this is what the commission has tried to determine. But how do they think "fair value" should be determined? There is no question about that. It is made plain by a statement appearing repeatedly in their brief in different forms to the effect that the determination of what is "fair value," "rests in the sound judgment of the commis-



sion as to what is 'fair' to the public as well as to the railroads." That is the milk in the cocoanut. The commission is declared to be "an expert commission 'appointed by law and informed by experience' whose findings will be respected and sustained by the court unless it clearly appears to amount to 'confiscation'"—from which it follows that a "fair valuation" is almost any valuation the commission decides to make regardless of the principles or methods it adopts!

How are we to find out if the valuation made "amounts to confiscation?" The test for that is whether, with the earnings they are allowed to make, the railways are able to raise enough capital to render adequate and good service. When are we going to find that out? Only after rates have been fixed, earnings have been made and the results have been observed. But if the railways become unable to render adequate service will that raise a conclusive presumption that the return earned by them has been too small, and that, therefore, the valuation on which it has been earned has been too small and should be increased? Not at all. After regulation of their return by the commission from 1906 to 1916 the railways became unable to render adequate service. But the commission has never conceded by word or act that this was due to the fact that the return it allowed them to earn was too small and that, therefore, the basis on which they were allowed to earn it was too low; and since the restoration of the railways to private operation it has so regulated them that the return earned has been relatively no larger than in the years immediately preceding the adoption of government operation.

### *Where Commission's Theory Lands Us*

Thus we see where the theories of the commission and its lawyers regarding railway law and economics finally land us. First, railway property under private ownership is not entitled to the same constitutional protection from confiscation as other property. Second, its regulation should "enforce the closest practicable analogy to government ownership and operation." Third, valuation should be based on "prudent investment," but since this cannot be ascertained it must be left to be determined arbitrarily by the commission in accordance with the "closest practicable analogy to government ownership." Fourth, the test of confiscation of railways is the adequacy of the service they are able to render, and, if they are able to render a more than adequate service the valuation fixed and the return allowed to be earned are too large and should be reduced, while, if the service rendered becomes inadequate it would seem to follow that both the valuation and the return allowed to be earned are too small and should be increased. But the commission may hold that the inadequacy of service is not due to valuation and the return earned—then how is the controversy to be settled? By appealing to the courts to determine whether the commission's regulation actually has caused the inadequacy of service and therefore has been "confiscatory." In other words, on this theory what the courts are to settle in future on appeals from the commission is whether railway service is adequate, and if not why not!

The commission and its lawyers are to be congratulated on the originality and resourcefulness they have shown in developing new theories both as regards the law applicable to railway property and the economics of transportation by railways under private ownership. If the courts should uphold them the commission would be given practically unlimited arbitrary power over the billions of private capital that have been invested in our railways. As it seeks this power, no doubt it could be relied upon in exercising it to endeavor to "enforce with practical wisdom the closest practicable analogy to gov-

ernment ownership and operation." It would be virtually the only judge of what was "practical wisdom." If it believed it would be "practical wisdom" to so enforce the analogy as to destroy the earning capacity of the railways and thereby drive them into government ownership and operation it could do so.

Certainly if owners of capital would continue to invest it in the railroad industry after being put on notice that it would have in future virtually no protection excepting from the "practical wisdom" of the members of a government commission whose appointment and performance would depend on their social and economic philosophy and political influence, then owners of capital would show more confidence in such a government commission than they ever would have shown in the past.

## Railway Grading Development

**R**ENEWED activity in railroad construction during the period following the enactment of the Transportation Act has been accompanied by development in grading machinery to which little attention has been directed except as individual pieces of equipment have been described or as reference to their use has been made in articles concerning construction projects. Nevertheless, marked changes have taken place; larger and more powerful excavation machinery has been built and larger and stronger dump cars have been introduced, etc.

However, improvement has been by no means limited to mere increases in size and strength; in fact, there has been some tendency in the opposite direction, as evidenced by the popularity of the small "whirly" shovel. Of limited weight and mounted on crawler treads it is much more mobile than the larger machines and therefore much more easily moved to the job over poor roads in heavy country, than the 60, 80 or 100-ton shovels. For the same reason it permits of greater flexibility of use in short deep cuts where frequent changes of position are necessary. These light machines, however, are not without their disadvantages. Of limited power, their use in classified materials entails greater expense for blasting and heavier outlay for repairs than is the case with the sturdier machines of greater weight.

Conflicting tendencies are also noticed in the handling of the excavated material. Whereas the advent of the large steam shovel gave a definite impetus to the use of standard-gage equipment, the heavier expense for track maintenance and filling trestles, together with the particular advantage of small capacity shovels under certain conditions, have pointed to definite advantages of narrow-gage locomotives and cars. Thus, on a construction project recently completed, which entailed moving six million cubic yards of material, fully half of the shovel excavation was disposed of in the smaller cars.

Observation indicates that reputable contractors are exercising a fine discrimination in the selection of excavating machinery from the wide range of varieties now at their disposal. There is also evidence of the continuance of that resourcefulness which has been characteristic of railway builders throughout the entire history of construction. As an example, the use of two shovels in echelon formation may be cited; a heavier machine making a second cut behind a small one but with a dipper stick long enough to load cars in the same train. Railway construction was deemed to be in a highly developed state twenty-five years ago, but the opportunities for improvements in practice are fully as great today as at any time in the past. The motor truck, a recent entrant in this field, promises to become an important factor and bring about marked changes in methods.



A Lighted Retarder Yard Showing Control Towers and a Retarder

# The Lighting of Railroad Yards\*

*An outline of floodlighting requirements and suggestions for meeting them*

By H. E. Mahan and R. J. Swackhamer

Illuminating Engineering Laboratory, General Electric Company, Schenectady, N. Y.

**F**REIGHT terminal yards are classified in accordance with the purpose that they are intended to serve, such as receiving yard, classification yard, departure yard, etc. A classification yard should be provided with sufficient light on the cars to permit safe walking on the tops, along the tracks to clearly see the switches and between cars to permit safe walking in these areas. Dark shadows handicapping the policing of the yard should be avoided and glare, the bugaboo of all kinds of lighting, should be carefully guarded against.

In the case of the retarder system the operator must clearly see the "cuts" as they move over the ladder; changing shadows that will disconcert him as to the speed at which the "cut" is moving must be avoided. A higher intensity and a more diffused illumination should be provided at the throat of the yard in the retarder system as it is here that the cars are retarded to drift to their destination; whereas, in the case of the car rider system, control of the cut is maintained until it is coupled to the train being made up. The operator controlling a retarder yard must clearly see the cars to judge and regulate their speed; he must be able to see the intervening track between the cut and the train it is to join in order to impart to it the speed it must have to reach its train and couple without damage.

The above lighting requirements must be satisfied with due consideration to the limited space in a railroad yard for placing poles or towers and with the least cost of installation and maintenance for the maximum of efficiency. The light source found most satisfactory in fulfilling these conditions is the so-called floodlight.

Economy of installation and operation are favored by concentrating the power requirements in light sources of large capacity at a few locations throughout the yard; minimizing of shadows and uniformity of illumination are best effected by using a large number of smaller units spaced at short intervals in the yard. A compromise of these factors has resulted in the practice of using floodlighting projectors with light sources of 1000 watts capacity grouped in batteries of from 3 to 12 units as best meet local conditions. Owing to the prevalence of dust, dirt and corrosive gases in a railroad yard and exposure to the elements, a floodlighting projector in this service should be weatherproof, dust proof and non-corrosive. The necessity of working on a tower in maintaining the equipment requires that the operations of relamping, cleaning, focusing and adjusting may be done conveniently and safely by the workmen. As most of this work will be done in the daytime, it is desirable that it can be done without disturbing the positioning of the projectors or that the projector may be returned to its original position by mechanical means, otherwise it will be necessary to visit the tower again after dark to adjust the direction of the beams. As the wind stress is the most important factor in the determination of the size of the tower members, the projectors should offer as small a windage area as possible and their weight should be kept to a minimum for convenience in handling. Convenient focusing and adjusting mechanisms must be provided.

The cost of towers, distribution system, etc., tends to make the cost of producing a unit of light high and warrants the use of reflectors of the highest coefficient of reflection and their careful upkeep.

\*Abstract of a paper presented before the twenty-first annual convention of the Illuminating Engineering Society, Chicago, Ill., October 11-14, 1927.



### Methods of Lighting

The lighting of a railroad yard is largely a matter of adapting principles found best by experiment and experience to the conditions peculiar to the yard in question. There are for the most part two general systems of lighting; namely, group and distributed. By the group system is meant an arrangement whereby the projector equipments are concentrated at relatively few points. The distributed system, on the other hand, employs a number of locations with the projectors distributed throughout the yards.

Both of the systems are further sub-divided, depending upon whether the light is projected in the direction

against a bright background or against the specular reflections from the rails, it has been found that a ratio of approximately three to one in favor of "with traffic" projection of light works to the best advantage.

It should be borne in mind that in the foregoing discussion we are considering gravity switching classification yards. As stated previously, the selection of a system of lighting depends to a great extent on local conditions. Adequate room for tower foundations, source of power and many other conditions of a local nature must of necessity have a bearing on the solution. Further as an aid in determining the system to be used, a careful analysis of the comparative costs both initial



An Example of Silhouette Lighting

of traffic or against the direction of traffic. A distinct difference in visual effect results from the two arrangements. Light projected in the direction of traffic eliminates to a great extent the possibility of dangerous glare and makes objects visible by reflected light. On the other hand, with the light delivered against the traffic, objects are seen in silhouette against a bright background and the specular reflections from the rails clearly define the tracks. It is obvious then that a compromise is desirable. Just such a compromise has been found to work out very satisfactorily in practice. Since objects near are seen perhaps to the best advantage by direct or reflected light and those at a distance by silhouetting them

and operating of the two systems as applied to the yard in question will prove of interest and at the same time more than likely be the deciding factor. The distributed system obviously costs more to install and maintain but at the same time it provides a uniformity of illumination together with an effectiveness in fog and smoke that is sometimes very difficult to obtain with other means of lighting.

Receiving and departure yards in general are taken care of in quite a similar manner to gravity classification yards. "Flat" or engine classification yards in the majority of cases can be handled to advantage in a different way. Inasmuch as this type of switching means two-



A Yard Illuminated by the "Group" System of Lighting, Illustrating Vision by Reflected Light

way traffic, it is good practice to employ the group system with two-way projection of light. This means of lighting is invariably found to be the most economical and at the same time entirely satisfactory.

Mechanical retarding of cars and the areas that go to make up the active part of a yard employing this method of control bring into this discussion still an entirely different scheme of lighting. This means of retarding is comparatively new and to date very few yards have been illuminated. Experience, limited as it is, however, indicates that it is essential that the projector equipment be located in such a way as to project light in the same direction as the operator views the various movements. This means usually from three to six locations, depending on the size of the yard and the number of control points. Inasmuch as towers are required in such a yard to enable the operator to occupy a point of vantage, an opportunity presents itself to combine the retarder control and floodlighting towers in a single unit. This, however, to the knowledge of the authors, has not been done and

this with projectors of suitable beam characteristics we can be sure of illumination free from objectionable glare and in every respect satisfactory.

#### Towers and Their Locations

The practice of grouping a number of large capacity units at comparatively few locations has brought about the use of towers ranging from 75 ft. to 115 ft. in height. Naturally, towers of these proportions require substantial foundations and unfortunately in some of the older yards difficulty is encountered in finding the necessary space. When such a problem presents itself the answer must obviously again be a compromise. It is desirable, of course, to make use of any natural elevations that exist and in car rider yards it is considered good practice to locate a lighting tower, which may be called the master tower, on the high point of the hump. Frequently, due to limited space at the hump it is necessary to place a tower at a lower level, in which case additional height is provided and the structure located



A Railroad Yard Illuminated by the "Distributed" System of Lighting

prevailing practice is to mount floodlighting towers a short distance behind the control towers.

The 1926 report of the committee on illumination of the Association of Railway Electrical Engineers recommends lighting intensities of 0.04 to .15 lumens per square foot for ordinary requirements and suggests considerably higher values where speed of operation is of prime importance.

It is the opinion of the authors that values ranging from 0.25 to 0.50 lumens per square foot should form the basis of design for average intensities over the active areas of a retarder yard. Of particular importance in this type of yard is the question of adequate coverage and, consequently, when this feature has been carefully planned the illumination values invariably run in excess of those mentioned above.

This brings us to an important point in the design of railroad yard lighting irrespective of the proposed system—that of coverage. Inadequate coverage is frequently characterized by objectionable glare. In other words, uneven illumination creates contrast and dangerous glare results. The remedy for this condition is the use of projectors with the proper beam characteristics. High mounting heights, of course, tend to eliminate glare and produce uniform illumination and by supplementing

as near as possible to the hump. Suitable space for towers can generally be found for the remainder of the yard either in the body of the yard or along the sides. The best results will be had by projecting the light parallel with the tracks.

The maximum effective range of light projection depends almost entirely on the smoke and fog conditions encountered. Our experience would lead us to believe that approximately 2,000 ft. represents a practical maximum. The range of a projector is in a sense unlimited, but the effectiveness of the light projected must necessarily depend on prevailing conditions. This, then, means that tower spacings range between approximately 2,000 ft. and 4,000 ft. depending upon the system employed. The average yard under these conditions will require about four towers with, approximately twenty projectors. The initial installation and foundation costs of the tower, therefore, represent the greatest item of expense in a yard lighting system and make necessary careful consideration in the selection of tower locations.

As stated, towers for railroad yard use range from 75 ft. to 115 ft. Ninety-foot structures have found favor with many railroad systems. This height is in keeping with present day practice and represents a practical compromise. Difficulty is quite often experienced in raising



assembled towers that exceed 115 ft. in height. The majority of cranes found in railroad service will swing 90 ft.-110 ft. structures with ease.

Fabricated steel is quite generally accepted as standard construction for towers, this being brought about largely because of the suitability of this construction for the heights demanded and the permanent nature of such a structure. Baskets or platforms are arranged on these towers to accommodate the number of projectors required and good practice provides for reasonable expansion by allowing for additional projectors. The projectors are arranged in two tiers and located as near as possible to the outer edges of the platform in order not to have the light intercepted by the platforms.

In the interests of the safety of the men working on these towers, a ladder mounted on the inside of the tower is provided as a means of reaching the platform. This ladder runs from the ground to the platform where a trap door is provided, which when closed is flush with the floor of the platform and forms a part of it. Such provisions as rest platforms, half way between the ground and the top, have proved satisfactory.

#### Power Distribution and Control

There is, as a rule, power available at or near a railroad yard. This power ranges from 2,300 to 6,000 volts and is used, when stepped down, for various purposes in and around the yards and shops. The addition of a lighting system means in some cases an extension of the present service while in other instances entirely new lines or circuits have to be run. In the former, the practice is to bring the high tension to each of the tower locations where it is stepped down and controlled, each tower as a unit. Where new lines are run and particularly where they serve the lighting only, an opportunity is given to control the entire lighting service at the power station. There are in general the following methods of control:

1. Each tower—Controlled separately on secondary side.
2. Complete installation—control of primary by master switch at station.
3. Cascade—relay and contactor arrangement turning towers on successively.
4. Carrier current—controlling the entire system.

#### Design and Maintenance

There are many factors requiring consideration in the design of a railroad yard lighting system and many of the means of satisfying the requirements demanded by these factors are in conflict with each other, necessitating a compromise in the final design. This makes necessary a careful study of the conditions and requirements surrounding each yard in order that these factors may be intelligently weighted and the compromises made in a practical manner. In the case of new yards the efficiency of the lighting system may be greatly enhanced by making provisions in the layout of the yard for suitable tower locations.

The matter of proper maintenance is also essential. A well designed system of lighting may soon deteriorate into one very unsatisfactory if the equipment is not systematically serviced. Dust and dirt absorb light and burned out lamps affect the distribution of light throughout the yard and lower the level of illumination.

The railroads approached this subject with some trepidation, fearing that by illuminating the yards there would be difficulty in seeing the switch signals. Experience has proved this to be unfounded, the colored lights of the signals appearing as clearly in contrast with the yard lighted as they do with the yard dark. Statistics compiled by the railroads clearly demonstrate the economic advantages of the lighted yard as against the unlighted yard.

## Discrimination Against Intrastate Commerce and I. C. C.

WASHINGTON, D. C.

**A**N issue of undue prejudice to intrastate commerce and undue preference of interstate commerce, and of unjust discrimination against intrastate commerce, is not within the purview of the interstate commerce act, the Interstate Commerce Commission held in a decision made public November 3 on a complaint filed by the Mutual Creamery Company, of Salt Lake City, against the American Railway Express Company and the western railroads.

#### Milk and Cream Rates

The complaint, filed July 1, 1922, among other things alleged that the interstate rates for the transportation of milk and cream by railroad and by express between points in Utah and points in other states were unreasonable, unduly prejudicial and unjustly discriminatory to the extent that they exceeded rates applicable intrastate in Utah, Idaho, Nevada, Oregon, Wyoming, Montana, Arizona, Colorado, California and Washington. Other grounds for attacking the rates also were cited but the commission dismissed the case on these grounds for want of competent evidence, stating that "the situation is unsatisfactory and calls for correction but we are unable to find the remedy in this record." Extracts from the report, by Commissioner Lewis, dealing with the question of jurisdiction, as to which a committee of state commissioners concurred with the finding, are as follows:

Under the provisions of section 3 (1), which in their present form were part of the original act, our authority to deal indirectly with intrastate rates of an interstate carrier subject to the act for the purpose of removing undue prejudice to the interstate commerce of persons and localities has been upheld. *Houston & Texas Ry. v. United States*, 234 U. S. 342; *Ill. Cent. R. R. Co. v. Public Utilities Comm.*, 245 U. S. 493. But section 13 (4), added by the transportation act, 1920, makes specific provision with respect to interstate-intrastate rate maladjustments, and upon it the present question therefore turns. It empowers us, in cases of "undue or unreasonable advantage, preference, or preference as between persons or localities in intrastate commerce on the one hand and interstate or foreign commerce on the other hand, or any undue, unreasonable, or unjust discrimination against interstate or foreign commerce, which is hereby forbidden and declared to be unlawful," to prescribe rates which will remove such advantage, preference, prejudice, or discrimination. Under its provisions our authority to deal directly with intrastate rates and fares in order to remove undue prejudice to or unjust discrimination against interstate commerce has been upheld. *Wisconsin R. R. Comm. v. C., B. & Q. R. R. Co.*, 257 U. S. 563; *New York v. United States*, 257 U. S. 591.

#### Citations

The cases cited are of immediate interest, for the reason that the power and duty of the states in respect of intrastate commerce, reserved to them by the Constitution and expressly excluded from our powers under the interstate commerce act, are left undisturbed. The coexisting federal power over the relationship of interstate and intrastate rates may be exercised in direct operation upon intrastate rates only to the extent necessary for effective regulation of interstate or foreign commerce. \* \* \*

There is not to be imputed to Congress an intention to transcend its constitutional powers unless the section in question is not reasonably susceptible of any other interpretation, which manifestly is not the case. Only in a strained sense could it be said that the removal of undue prejudice to or unjust discrimination against intrastate commerce resulting from a difference in levels of interstate and intrastate rates is necessary for the effective regulation of interstate commerce, and certainly the effective protection of interstate commerce calls for no such action. The interstate commerce act should not be broadly construed to empower this commission to take action against rate adjustments for purposes which are primarily of intrastate concern and are not essential to the proper regulation of either interstate or foreign commerce.



Havana from the Harbor

## Passenger Men Meet in Havana

*Traffic officers discuss serious conditions of the business  
and methods of meeting them*

**T**HE American Association of Passenger Traffic Officers held its annual convention in Havana, Cuba, on November 1-3 with an attendance of approximately 200. Discussion centered on the serious situation which the railroads now face by reason of declining passenger traffic, and ways and means by which these losses may be stopped and new business gained.

At the opening session H. N. Rodenbaugh, vice-president of the Florida East Coast, addressed the delegates on the subject of Cuba, outlining the history and resources of the island and its attractions for the American tourist. Following Mr. Rodenbaugh's address the various topics on the docket were taken up and discussed.

### Report on Association Ticket Paper

The committee on association ticket paper reported a voluntary reduction in price by the manufacturer. It urged the adoption of standard colors for tickets, viz., green for one-way tickets; drab for round-trip and canary for all other purposes. Attention was drawn to the danger of issuing advertising matter or samples in the form of tickets. The present total of licensed ticket printers was given as 28.

### Joint Committee's Report

The joint committee of the American Association of Passenger Traffic Officers and the Railway Accounting Officer's Association presented a report containing a resolution adopted by the accounting officers at their convention at Denver last June. This resolution called attention to the fact that some passenger traffic men prescribe adjustments which are not in accord with exchange accounting rules and that the accounting officers, following each issue of their publication, "Railway Accounting Procedure," propose to place before the traffic men these rules so that they may be governed accordingly. The rules governing "interline tickets exchanged or honored without exchange when incorrectly issued" were then given in detail.

### Report on Standard Forms for Interline Tickets

The committee on standard forms of interline tickets reported on two suggestions which had been made to it.

The first was a recommendation that the standard ticket contract form be changed to read "good for one continuous passage on trains scheduled to stop at destination shown." This suggestion was made by a railroad which had been involved in a lawsuit as the result of charging a passenger on a train not scheduled to stop at a given destination for transportation to the next scheduled stopping point beyond. The committee, however, did not favor the proposed change because, among other things, it would not permit the passenger to make a portion of his trip on a through train, completing it on a local train.

A suggestion also was received from the Railway Accounting Officer's Association recommending the inclusion of a sexblock on excursion tickets to be punched to show whether holder were man or woman—this in addition to signature to insure proper use of these tickets. The committee disapproved this suggestion, stating that this additional safeguard could not be relied upon and that there was danger that it would be disregarded by selling agents; the use of the signature, if carefully observed, would serve the purpose.

### Territorial Committees

Reports from the several territorial committees were brief. One announced active consideration of methods for simplifying interline fares and simplifying passenger tariffs. Another noticed a change in rates charged where passengers buy a ticket, check their baggage on it and then use some other method of transportation, turning in their ticket. In general the rate change involved increases in shorter distances where this practice is most prevalent and decreases for longer distances.

### Co-operative Distribution of Folders

A report was presented on the work of the General Folder Distributing Agency of Western Lines. This agency was organized two years ago and is now distributing 836,000 folders a month, with 62 railroads participating, and literature is handled for 94 roads with 15,144 ticket offices on 146 different railroads as destinations for



this printed matter. Formerly all these 146 railroads had to send printed matter to all the other 146, which in turn had to separate the material received and send it out to all its agents. Now the railroad sends its printed matter to the folder agency which selects the proper number from it and from all other railroads, handling the distribution in one operation.

Some of the advantages claimed for this method of distribution are: More economical; more scientific in accurately gaging requirements of each agency, sending no more and no less than needed; accuracy in deliveries; avoidance of delay in distribution and waste in oversupply or undersupply; reduced labor and expense in passenger traffic offices; reduction in postage, express, packing and other printers' charges; saving in mail sorting required.

#### Refinements of Service

W. B. Calloway, passenger traffic manager of the Baltimore & Ohio, and H. H. Melanson, general passenger traffic manager of the Canadian National, spoke briefly on refinements in service adopted to increase the attractiveness of rail travel. Mr. Calloway dwelt particularly on improvements in day coach service, mentioning the reversible bucket-type coach seats now being used on his road. Mr. Melanson divided improvements into two categories, i.e. (1) mechanical for which no extra charge is made and, (2) refinements for which the passenger must pay. Under the first category he praised the mechanical department for the progress it had shown and said that passenger traffic officers should co-operate in telling mechanical officers of suggestions and praise from passengers affecting this phase of their work. Under the second category he stated as his opinion that "whenever the refinement essentially reduces the fare-earning capacity of a unit, the passenger utilizing it should be required to pay a correspondingly increased charge therefor." He also mentioned the rail motor car,



The Party at Mouserrate near Matanzas, Cuba

saying that it reduced the cost of service while at the same time making it more attractive to the passenger.

C. A. Cairns, passenger traffic manager of the Chicago & North Western, presented a report on Outstanding Experiences of 1927 in the Development and Retention of Passenger Traffic. He stated that there was some truth in the remark of an Eastern railroad man who stated that some "people want to ride on rubber," citing an instance of a bus succeeding in getting passengers when leaving at the same time as a train, charging equal rates but providing a slower schedule. An-

other cause for concern, he stated, was long distance travel in automobiles. Of 5 visitors to Yellowstone Park, 4 go by automobile and the continued construction of improved roads may tend to make the problem more severe rather than less so. The chief hope of the railroads, he believed, lay in making long distance service and rates as attractive as possible. He spoke of experience with various forms of reduced fares—shopper's tickets, coach excursions, generally reduced fares, week-end rates and summer excursions. The shopper's tickets,



Passenger Officers at Matanzas

he said, were attracting passengers who might use some other form of transportation. Coach excursions were found successful, where care was taken to see that they did not cut into regular business. The most successful coach excursions, he thought, were those operating from smaller points to large population centers, running between large terminals only on holidays. Generally reduced fares and week-end fares were not found to be particularly successful. The development of summer excursion business seemed to him a most promising field.

The committee on reduction in round trip fares reported that conditions varied so from road to road that no general rule could be laid down, but that each company would have to govern itself by its local conditions and local experience. Several delegates told their experience with reduced fares but opinions varied widely, even in the same territory.

#### Buses and Airplanes

Gerrit Fort, retiring vice-president of the Boston & Maine, spoke briefly on the proposed use of airplanes in conjunction with railroad service. Some expressed the opinion that the use of the bus, allowing the curtailment of unprofitable train operation, was the best solution for the passenger traffic problem. Others believed that as congestion on the highways grows passengers may tend to return to the rails, and this move might be hastened if highway laws were enforced so that safety on the highways might improve. There seemed to be little dissent from the opinion that the private automobile rather than the bus was responsible for the greater part of the loss in business.

#### Other Business

It was announced that the subject of simplification of passenger tariffs was in the hands of a committee which would render its report through the several territorial passenger associations.

L. W. Landman, passenger traffic manager of the Michigan Central, presented two reports—one on co-

operative efforts with hotel men in Chicago to induce travel to that city and another on winter excursions to Niagara Falls. On the first subject he stated that the hotel men of Chicago were preparing a handsome booklet telling of the city's points of interest and beauty and that the railroads would help in its distribution. The idea was one, he thought, which might be of value elsewhere. Concerning winter excursions to Niagara Falls, he told of the illumination of the frozen cataract and the efforts of local interests thereby to promote a year-round business. He stated that 14 excursions were operated from Central Passenger Association territory to this point last January and February with rates the same as for summer coach excursions, with an additional charge of 50 per cent for tickets valid in Pullman cars.

A proposal was made by A. D. Bell, passenger traffic manager of the Missouri Pacific, that the secretary of the association compile a list of all named trains in order that in selecting new names there be no duplication, such as had occurred in the past. This proposal was placed in the form of a motion and was carried. There appeared to be a consensus that train names were an important factor in arousing public interest and that care in selection was important.

#### Election of Officers and President's Address

Officers were elected as follows: President, L. M. Allen, vice-president and passenger traffic manager, Chicago, Rock Island & Pacific; vice-president, J. D. Rahner, general passenger agent, Florida East Coast; secretary (re-elected), W. C. Hope, passenger traffic manager, Central of New Jersey, New York.

Upon being inducted into office President Allen delivered a short address outlining the problems which now face passenger traffic officers. There never was a time, he said, when these officers were confronted with such baffling problems as at the present time. Passenger business reached its peak in 1920 when passengers carried one mile reached a total twice as large as that of 1905 and four times as large as the 1890 figure. Statistics indicate now, however, that in 1927 passengers carried one mile will total about 34 billion, or less than in 1913, and passengers carried will be about 838 million, or less than in 1907.

In 1920 passengers carried one mile were 47,850 million and the loss since 1920 will therefore be 13.8 billion which, figured at the average rate of 2.9 cents, shows an annual loss of \$380,000,000. This decline has not affected all carriers alike. But 16 per cent is the loss in the East, 32 per cent in the South, while in the West the decline is 40 per cent—or, in money, \$97,000,000 in the East, \$70,000,000 in the South and \$213,000,000 in the West.

There is, he continued but little question as to where this loss has occurred, i.e., in the coach business. Earnings from sleeping and parlor car passengers in 1927, while they have shown some slight decline from 1926, will nevertheless be 24 per cent larger than in 1921, whereas coach earnings will be 32 per cent less. And no proportionate reductions in service and costs have been possible.

Railroad men are studying this problem, he said. Great improvements have been made in service. Many new low rate excursions have been operated. Rail motor cars and bus service have been installed. Still, the problem is not solved, since business has declined more in comparison with the preceding year in 1927 than it did in either 1925 or 1926.

Mr. Allen predicted, however, that the traffic officers and their association would measure up to their task and he urged on the audience the importance, on the

one hand, of getting all the business possible and, on the other, of helping the operating department to reduce expenses.

## Freight Car Loading

WASHINGTON, D. C.

**R**EVENUE freight car loading in the week ended October 29 amounted to 1,112,621 cars, a decrease of 96,257 cars as compared with the corresponding week of last year and an increase of 21,467 cars as compared with 1925. Decreases as compared with last year were reported in all districts and in all commodity classifications, the principal reduction being in the coal loading, which was 54,598 cars less than that for the corresponding week of last year. Ore loading also showed a decrease of 20,540 cars. The summary, as compiled by the Car Service Division of the American Railway Association follows:

#### Revenue Freight Car Loading

WEEK ENDED SATURDAY, OCTOBER 29, 1927

Districts	1927	1926	1925
Eastern .....	245,268	269,691	246,977
Allegheny .....	215,224	243,066	213,759
Pocahontas .....	57,808	64,884	59,673
Southern .....	161,738	169,676	157,869
Northwestern .....	166,327	182,871	150,107
Central Western .....	174,359	183,919	175,992
Southwestern .....	91,897	94,771	86,777
Total Western Districts .....	432,583	461,561	412,876
Total all roads .....	1,112,621	1,208,878	1,091,154
Commodities			
Grain and grain products .....	56,168	56,677	47,564
Live stock .....	38,183	39,993	40,566
Coal .....	182,136	236,734	194,542
Coke .....	9,287	13,314	15,051
Forest products .....	69,299	72,899	70,094
Ore .....	42,071	62,611	37,295
Mdse. L. C. L. ....	268,433	271,328	269,913
Miscellaneous .....	447,044	455,322	416,129
October 29 .....	1,112,621	1,208,878	1,091,154
October 22 .....	1,128,486	1,200,941	1,120,677
October 15 .....	1,119,872	1,202,780	1,106,036
October 8 .....	1,100,552	1,174,928	1,106,036
October 1 .....	1,126,390	1,180,049	1,113,283
Cumulative total, 44 weeks .....	44,459,425	45,101,716	43,430,103

The freight car surplus for the period ended October 23 averaged 151,893 cars, including 50,605 coal cars and 78,403 box cars.

#### Car Loading in Canada

Revenue car loadings at stations in Canada reached another new high record in the week ended October 29 when the total was 90,685 cars, exceeding the record of the previous week by 3,072 cars, and an increase over the same week last year of 7,325 cars.

Commodities	Total for Canada			Cumulative totals to date	
	Oct. 29, 1927	Oct. 22, 1927	Oct. 30, 1926	1927	1926
Grain and grain products ..	27,025	25,625	22,071	359,209	368,736
Live stock .....	3,588	3,442	3,501	96,531	93,751
Coal .....	8,902	8,570	8,336	296,077	253,147
Coke .....	571	533	493	15,176	15,891
Lumber .....	3,944	3,576	3,931	163,716	157,984
Pulpwood .....	1,477	1,259	1,587	130,610	114,137
Pulp and paper .....	2,216	1,966	2,275	94,917	102,375
Other forest products .....	2,961	3,460	3,208	131,073	133,212
Ore .....	1,997	1,898	2,367	72,963	75,810
Merchandise, L. C. L. ....	18,488	18,397	17,842	742,196	706,253
Miscellaneous .....	19,516	18,887	17,749	649,786	619,993
Total cars loaded .....	90,685	87,613	83,360	2,752,254	2,641,289
Total cars received from connections .....	38,464	38,844	40,608	1,624,753	1,611,086



# The Possibilities of the Motor Rail Car

*A theoretical discussion of the best vehicle for high speed rail transportation*

By Gen. A. Guidoni

Air Attache, Italian Embassy, London, Eng.

**S**UCH important factors in rail transportation as power, comfort and speed have been remarkably improved since 1825. This has been especially so with the first two factors named but, in the case of speed, the progress made during the past 20 years has been materially slower. This condition has been due essentially to the fact that any increase in speed ordinarily requires an increase in power and weight of the locomotive, which is not always possible due to clearance limi-

Table I—Horsepower Required for Different Forms of Transportation

Form of transportation	Speed m.p.h.	Hp. per passenger
Motor bus.....	18.6	1.0
Touring car.....	24.85	2.0
Limousine.....	40.4	14.0
Racing car.....	174	450
Local railroad train.....	18.6	.5
Through train.....	31	3.0
Express train.....	37.3	5.0
Pullman car train.....	49.7	12.0
Light aeroplane.....	49.7	7.0
Tourist aeroplane.....	80.78	30
Air liner.....	99.42	60
Racing plane.....	261	800
Cargo and passenger steamer.....	15.5	8.0
Ocean liner.....	31	25
Motor rail car, 650 hp.....	124.27	25
Motor rail car, 100 hp.....	74.56	4.0

tations. Competition between the railroads and highway and air traffic has become a real problem for railroad management and promises to become more so with the development of the latter.

The horse car, automobile, steam railway trains, ships and aircraft, have different speeds and require different

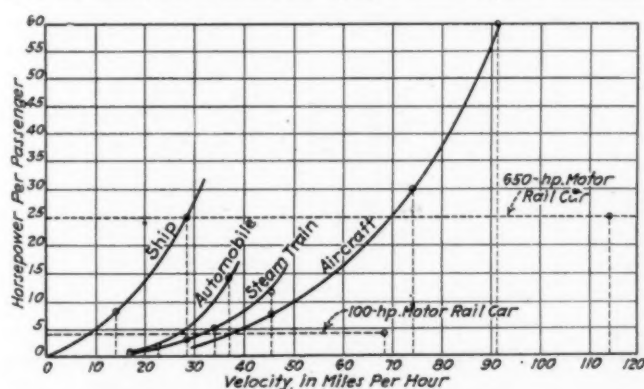


Fig. 1—Relation of Horsepower Developed Per Passenger Carried to Speed for Various Modes of Transportation

power per passenger carried. The laws, however, that regulate resistance on automobiles, railway trains and aeroplanes are the same, although this may appear somewhat strange to the reader. But resistance is due partly to friction and partly to head air resistance, the first being approximately constant and the second increasing about as the square of the speed.

When the speed increases to 60 m.p.h., air resistance assumes considerable importance, which depends on the form of vehicle. The following table shows the air re-

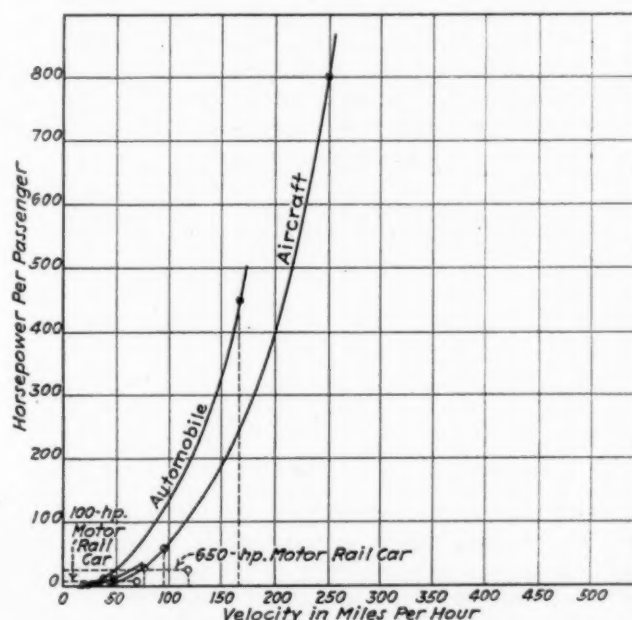


Fig. 2—Relation of Power Used Per Passenger and Speed With Aircraft at 800 hp. and 250 r.p.h.

sistance for increasing speeds for a car weighing seven tons. It is evident from the figures shown that the form and shape of the body is of considerable importance.

## Effect of Form on Head End Air Resistance

Speed m.p.h.	Total friction, lb.	Total air resistance for ordinary forms, lb.	Total air resistance for a stream-lined body, lb.
31	46	220	22
62	46	1,000	90
125	46	4,200	370
190	46	9,100	800

Weight is another element that has a direct effect on train resistance and the amount of friction set up is directly proportional to it. In this connection it is, therefore, interesting to note the comparison for the various forms of existing modes of transportation as to speed and horsepower per passenger, dead weight per passenger and dead weight per horsepower.

A comparison of the speed in miles per hour and the horsepower required per passenger for a number of the prevailing modes of transportation is shown in Table I. The data on which the figures in this table are based, as well as the data and figures given elsewhere in this article, are based largely on Italian and English practice. In this table, figures are shown for four types of automobile transport, four types of steam train service, four

of air craft, two of steamship and two types of motor rail car proposed by the author. The reader's special attention, however, is called to the relative speeds and horsepower per passenger for the limousine automobile, the Pullman car train and the 100-hp. rail car.

Figs. 1 and 2 show a graphic comparison between the four principal forms of transportation and the proposed 650-hp. and 100-hp. motor-rail cars. It will be noted in Fig. 1 that the velocity obtained for both air craft and the two rail cars, per horsepower per passenger is considerably greater than in the remaining three forms of transportation. The two curves for automobile and steam trains begin to diverge most rapidly after 30 m.p.h. Fig. 2 gives a somewhat different comparison in which high horsepower per passenger and greater speeds are shown. The curve for steam trains rises only a short distance between the curves for automobile and air craft. Here again the ability of the 650-hp. and 100-hp. motor rail cars to attain a high speed at a comparatively low power output per passenger is shown.

Table II shows a comparison of the dead weight per passenger and the ratio of dead weight to total passen-

Table II—Dead Weight per Passenger for Different Forms of Transportation

Form of transportation	Speed, m.p.h.	Dead weight per passenger, lb.	Dead weight ÷ passenger weight
Motor bus	18.6	264.5	1.7
Touring car	24.85	485	3.1
Limousine	40.4	926	6.0
Racing car	174	3,307	21.5
Local railroad train	18.6	882	5.7
Through train	31	1,984	13
Express train	37.3	2,645.5	17
Pullman car train	49.7	4,850	31
Light aeroplane	49.7	441	2.9
Tourist aeroplane	80.78	793.66	5.1
Air liner	99.42	882	5.7
Racing plane	261	3,747.8	23
Cargo and passenger steamer	15.5	15,432.2	100
Ocean liner	31	26,455	170
Motor rail car, 650 hp.	124.27	639.3	4.1
Motor rail car, 100 hp.	74.56	551.15	3.6

ger or revenue weight for the same classification of transportation given in Table I. It will be noted that the only ratio of dead weight to passenger weight in railroad passenger service that admits of a real comparison to air craft or the two proposed rail cars, is that of

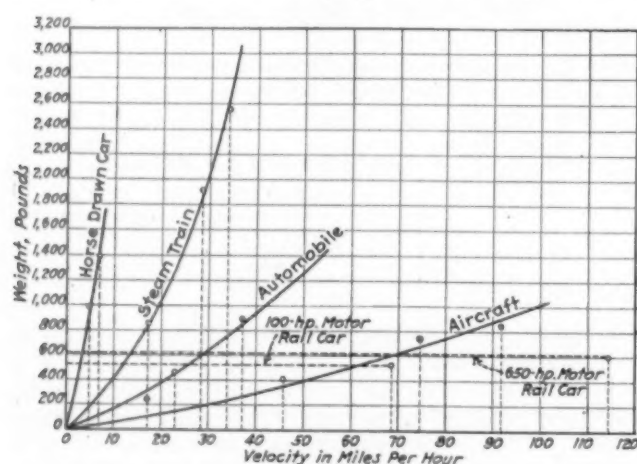


Fig. 3—Relation of Dead Weight Per Passenger and Speed for Different Forms of Transportation

5.7 for local train service. This is of special interest due to the fact that highway traffic in the United States has made its greatest inroads into the local passenger business of the railroads.

A graphic comparison of the dead weight per passenger with the velocity in miles per hour is shown in Fig. 3. Here again the possibilities of the two proposed de-

signs of motor rail cars with respect to greater speeds at relatively low weight per passenger are shown.

The conclusions to be arrived at from these comparisons is that the horsepower per passenger is reasonably low for the railroad passenger train, while the dead weight for automobiles and aeroplanes is considerably greater. This is due to the fact that friction is a somewhat low resistance for a railroad train, which is, however, handicapped by its bad shape and high atmospheric

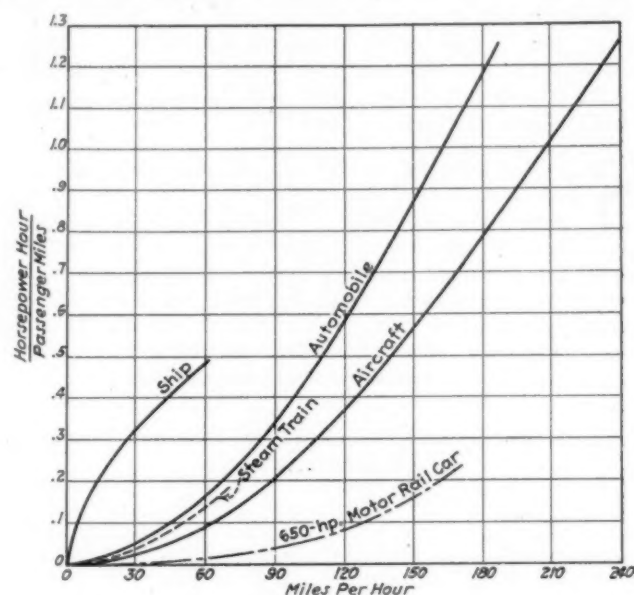


Fig. 4—Energy Expended to Transport One Passenger One Mile Plotted Against Speed

head resistance. It is, therefore, believed that a railroad passenger train can naturally attain the highest speed among all forms of transportation, if the dead weight and air resistance are lowered to the same values as for air craft.

Undoubtedly the most convincing term of comparison is the factor,  $\frac{\text{horsepower-hours}}{\text{passenger miles}}$  which is the energy

spent to transport one passenger one mile. The comparisons made in Table III and Fig. 4, show quite conclusively the superiority of the motor rail car over all the other forms of transportation. It will be noted in Fig. 4 that ships give a completely different curve, which is in accordance with the different way in which resistance varies with respect to speed in air craft, railroad passenger trains, automobiles and the two motor rail cars. The fact that all of the curves are very well shaped is undoubtedly an indication that the methods used in the calculations are correct. The aeroplane, which is frequently accused of being more costly to operate than a railroad passenger train, and ships, appears

Table III—Energy Required to Transport One Passenger One Mile

	Horsepower hours passenger miles
Motor bus	.02
Touring car	.031
Limousine	.106
Racing car	.99
Local passenger train	.009
Through train	.037
Express train	.052
Pullman car train	.093
Light aeroplane	.054
Tourist aeroplane	.143
Air liner	.23
Racing plane	1.18
Cargo and passenger steamer	.199
Ocean liner	.31
Motor rail car, 650 hp.	.075
Motor rail car, 100 hp.	.02



to be cheaper. It is evident that the common error made has been in not considering the speed. Fig. 4 also shows that if a speed of 125 m.p.h. could be attained by the steam train, the economic factor would raise to .684, when for the motor rail car, it is only .107. This proves the futility of increasing the speed of the ordinary railroad passenger train, and the necessity of developing a completely new type of railway vehicle, such as that to be described.

A summary design of a motor rail car of 650 hp. has been traced in which the following elements should be followed; namely, use of the same systems of construction and the same kind of materials as for aircraft, use of ball or roller bearings, and the adoption of an appro-

**Table IV—Analysis of the Centrifugal Force for the 650-hp. Car on Curves with Outer Rail Elevations of 20 and 30 Deg.**

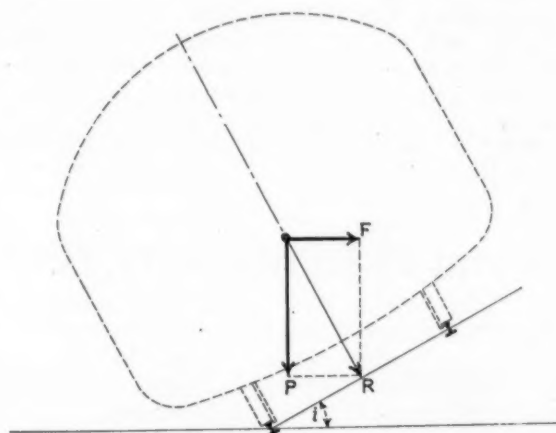
	20-deg. i. curve	30-deg. i. curve
Weight .....	P = 15,432 lb.	15,432 lb.
Curve radius.....	R = 2,953 ft.	2,953 ft.
Speed .....	V = 125 m.p.h.	155 m.p.h.
Speed .....	v = 182 ft. per sec.	227 ft. per sec.
Centrifugal force.....	F = 15,432 × .35	15,432 × .54
Curve radius.....	R = 1,968 ft.	1,968 ft.
Speed .....	V = 99.4 m.p.h.	126 m.p.h.
Speed .....	v = 147.6 ft. per sec.	185 ft. per sec.
Centrifugal force.....	F = 15,432 × .35	15,432 × .54
Curve radius.....	R = 984 ft.	984 ft.
Speed .....	V = 70 m.p.h.	89 m.p.h.
Speed .....	v = 105 ft. per sec.	131 ft. per sec.
Centrifugal force.....	F = 15,432 × .35	15,432 × .54

priate shape so as to reduce the atmospheric resistance to a minimum. Wind tunnel tests with different models have been conducted in Rome, Italy, with the object of securing the best data relative to this point.

An elevation and plan view of the proposed 100-hp. car is shown in Fig. 5. The general design of this car is the same as for the 650-hp. car. The specifications call for a Fiat A-14 650-hp. engine as a prime mover, with

The maximum speed is estimated at 143 m.p.h., with a normal speed of 125 m.p.h. Seats are provided for 24 passengers, not including the driver and a mechanic.

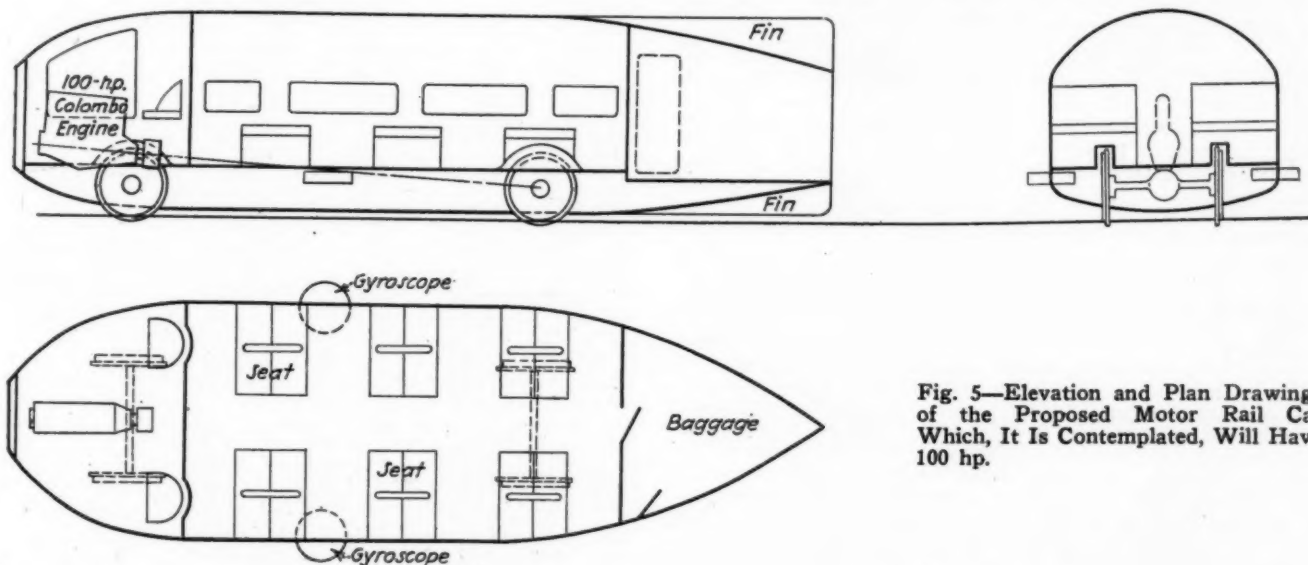
The important question of centrifugal force may be solved either by the use of a third rail or by increasing the elevation of the outside rail. With a 20-deg. eleva-



**Fig. 6—Analysis of the Centrifugal Forces Set Up When Rounding 20 and 30 Deg. Curves**

tion, referring to Fig. 6, the speed can vary from 72 to 125 m.p.h. with a curvature of from 5.73 deg. to 1.9 deg. A speed of from 90 to 156 m.p.h. can be maintained on curves of the same curvature with an outside rail elevation of 30 deg. An analysis of the centrifugal forces for various speeds is given in Table IV, the symbols refer to Fig. 6.

The author also drafted a summary design of a 100-hp. rail motor car with the object of ascertaining its possibilities and has estimated that it can maintain a



**Fig. 5—Elevation and Plan Drawings of the Proposed Motor Rail Car Which, It Is Contemplated, Will Have 100 hp.**

direct transmission. The overall length of the car is 34 ft. 6 in., the width 9 ft. 8 in. and the height 8 ft. 5 in. The diameter of the wheels, are to be 36 in. The estimated empty weight of this car is 8,598 lb. of which 2,644 lb. is the weight of the body and 1,764 lb. the weight of the engine. The remaining weight is divided as follows: Radiator and pipes, 330 lb.; transmission, 1,100 lb., chassis 540 lb.; wheels and brakes 1,110 lb. and miscellaneous equipment 1,110 lb. The estimated useful load is 6,834 lb., of which 3,968 lb. is passenger, 2,205 lb. is luggage and mail, and 661 lb. is gasoline. This makes a total loaded weight for the car, 15,432 lb.

normal speed of 67 m.p.h. This car is powered with a 100-hp. Colombo engine and has a loaded weight of 13,022 lb. It can develop a maximum speed of 74.56 m.p.h. The overall length is 34 ft. 6 in., the width 9 ft. 8 in., and the height 8 ft. 5 in. When empty the car is estimated to weight 6,630 lb. of which about 2,645 lb. is the weight of the body and about 350 lb. the weight of the engine. The load carried is 6,390 lb.; of which 3,970 lb. is passenger weight and 2,205 lb. is luggage and mail. A comparison of horsepower per passenger and the dead weight per passenger values of the two type of motor rail cars with similar values for railroad passen-

ger train, air craft and automobile, shows a striking superiority for the proposed new cars. We can expect from the railroads of today a speed much greater than is now prevalent because our knowledge of the technical problems entering into high speeds permits it. The aeroplane engine with its weight of 1.5 lb. per horsepower or the light Diesel, must be adopted for all vehicles.

It is predicted that, if the railroads do not seriously investigate and develop higher speeds for passenger service, they will be reduced to the lot of freight carriers only. The increase in speed from 60 m.p.h. to 125 m.p.h. has today the same importance which the first train had 100 years ago when it passed the stage coach going at 10 m.p.h.

## Final Valuation of G. N.

WASHINGTON, D. C.

THE Interstate Commerce Commission on November 9 made public its final valuation report on the Great Northern as of June 30, 1915, finding the final valuation for rate-making purposes of the property owned and used for common-carrier purposes to be \$382,400,000, that of the property used but not owned to be \$4,684,437, and that of the property owned but not used to be \$1,180,815. Commissioner Eastman dissented, expressing the opinion that the figure found is higher than the facts justify. Commissioner Woodlock concurred in part and Commissioners Hall, Taylor and Brainard did not participate.

Exclusive of the property of the Duluth & Superior Bridge Company, which is found not to be a common carrier, the commission had tentatively valued the properties involved at \$398,447,216, including working capital. This embraced \$395,353,655 for the value of the property used by the Great Northern. As to some of the contentions raised by the company at the hearings on its protest the commission says in conclusion:

This embraces \$395,353,655 for the value of the property used by the Great Northern. Protestants differentiate between economic value and value for rate-making purposes, and contend that, except for the property of the Minneapolis Western and the Duluth Terminal, these two values of their common-carrier property are equal. The two carriers named allege that they enjoy certain advantages because of their strategic location, and therefore the economic values of their properties are greater than their value for rate-making purposes. We are here concerned with finding a value for rate-making purposes. Protestants contend for final values which aggregate \$636,512,774 for all common-carrier property used by the carriers included in this report. The values sought for the respective properties are predicated on the carriers' estimates of what must be expended to produce the physical properties used for common-carrier purposes, ascertained by considering cost of reproduction new, the cost of lands and rights, and, in the case of operating properties, working capital. For the Great Northern specific amounts are also included for cost of development, including depreciation and appreciation. The total value sought for this carrier is \$627,605,754. This latter sum embraces \$467,774,779 representing the application of all the claims which the Great Northern makes for cost of reproduction new of the property which it uses in the public service, \$80,980,975 as the cost of acquiring its lands and rights and privileges therein, \$63,000,000 for net cost of development, including depreciation and appreciation, and \$15,850,000 for working capital, including material and supplies. The value thus sought exceeds that tentatively found by us in the sum of \$232,252,099.

We have explained our reasons for rejecting these claims, and also stated the principles which should apply when ascertaining these elements of value. The carrier's contentions for including in final value amounts representing the estimated costs of acquiring its lands are untenable. *Minn. Rate Cases*, 230 U. S., 352.

In developing its theory for ascertaining the value of property devoted to the public use, the carrier starts with the propositions: First, that the control of public utilities arises from the absence of competition, and the restrictions which regulation places around common carriers should not exceed the restrictions which would be imposed by perfectly free competition if it existed. Second,

that under conditions of free competition, the price of any commodity tends to approach that level which is just sufficient to attract capital to the enterprise, but that the requirements of this new capital are always determined by the requirements, meaning costs, of a non-existing plant or facility, rather than by those of one already created. From these premises the carrier argues that the return to railroad common carriers should be sufficient to induce the investment of new capital in such enterprises, which can be achieved only by basing the return on what would be the cost, at prices current as of date of valuation, to reproduce in a new condition the property which is devoted to the public service, or to build another plant capable of performing the same service. We have heretofore referred to the principles established in court decisions to guide in determining the value of public utilities. These establish that each property should be considered individually, giving consideration not only to what it would cost to reproduce the existing plant, but also to other elements which relate to value. In some cases this consideration may indicate that the cost of reproduction new should be the dominant factor in ascertaining value, but we are not convinced this is true for the properties we are here considering. In valuation cases already decided we have indicated some of the dangers which we are convinced attach to the method proposed by the carrier. The arguments advanced by the carrier are in many respects similar. This protest is not sustained. The Great Northern protests our failure to find a value of its property as of the time of this proceeding. The act requires that these valuations be brought down to date and it is our purpose to do so. The instant proceeding is in the nature of ascertaining a basis from which to start, and which may be brought down to date by such modification as may be warranted later.

The cost of reproduction new and cost of reproduction less depreciation of the property which the Great Northern owns we find to be \$379,756,489 and \$316,882,554, respectively, and the corresponding costs for the property which it uses we find to be \$382,614,524 and \$320,164,945. We have been unable to report the original cost to date of the Great Northern's common-carrier property, but have set forth in our order herein all available information pertaining to this subject. We also find the present value of lands owned, including rights, to be \$42,888,994 and that of lands and rights used, \$42,941,480. On date of valuation the Great Northern had outstanding capital liabilities of a total par value of \$607,755,422, of which \$249,133,313 represented preferred stock and \$358,622,109 represented funded debt. These totals include securities issued against the Great Northern's Canadian properties, which are not included in this report, and also include bonds issued jointly by the Great Northern and the Northern Pacific Railway in the acquisition of capital stock of the Chicago, Burlington & Quincy Railroad Company, as explained in the order entered herein. The Great Northern's investment in road and equipment, including land, is shown on its books to be \$384,273,853.22. If certain charges are excluded, which under our accounting classification are chargeable to other accounts, the above amount would be reduced to \$382,283,398.35. This latter sum embraces \$144,884,793.15 of recorded money outlay, the remainder representing, for the most part, the par value of securities issued or assumed. From 1890 to date of valuation the carrier's aggregate railway operating expenses were approximately 57 per cent of its operating revenues. During this same period it has consistently paid dividends, and during each of the 15 years preceding date of valuation the dividend rate was 7 per cent. We have given careful consideration to all facts of record pertaining to the value of the Great Northern's railroad as an economically developed, well maintained and seasoned property in successful operation as a going concern. We find that the value for rate-making purposes of the property of the Great Northern owned and used for purposes of a common carrier is \$382,400,000, of the property owned but not used \$1,180,815, and of the property used but not owned \$4,684,437.

On like consideration of the facts of record pertaining to the values of the other carriers embraced in this report, we find that the final value for rate-making purposes of the property owned or used for common carrier purposes by each of these corporations is as set out below.

Carrier	Final value		
	Owned and used	Owned but not used	Used but not owned
Montana Eastern Railway Company....		\$4,310,000	
Farmers' Grain & Shipping Company....	\$524,742		\$155,500
Brandon, Devils Lake & Southern Railway Company .....		155,500	
Minneapolis Western Railway Company..	716,992		81,496
Duluth Terminal Railway Company....	536,000		
Montana Western .....	185,600		

We have included in the final values of the respective properties the following amounts for working capital, \$9,650,000 for the Great Northern, \$12,822 for the Farmers' Grain & Shipping Company, and \$2,592 for the Minneapolis Western.



# Union Pacific Receives Eight New Observation Cars

*Steel cars 83 ft. long embody latest type of facilities, including barber shop and bathroom*

**I**N the latter part of 1926, the Union Pacific ordered eight observation cars embodying the latest features in car design and intended for service in the best Union Pacific trains. These cars, built by the Pullman Car & Manufacturing Corporation, have now been received and placed in service. They are provided with steel underframes and superstructure, being 83 ft. long and weighing light but with complete equipment, 154,500 lb. The seating arrangements include 26 chairs, two sections with upper berth, also five folding chairs for the rear platform and one sofa for the women's lounge. The space assignment in the car is approximately as follows: Observation platform, 8 ft. 3 in.; observation room, 16 ft. 2 in.; writing room and approach, 7 ft. 7 in.; buffet, 5 ft. 6 in.; smoking room, 20 ft. 3 in.; and women's lounge, 7 ft. 1 in. A toilet, a barber shop and a bathroom take up the balance of the car, the general arrangement of which is shown in the floor plan.

The cars are finished throughout in Mexican mahogany, stained antique brown, with the exception of the buffet which is finished in natural oak. The ceiling and lower deck panels throughout the car are enameled in a cream color. The wood interior trim, including mould-

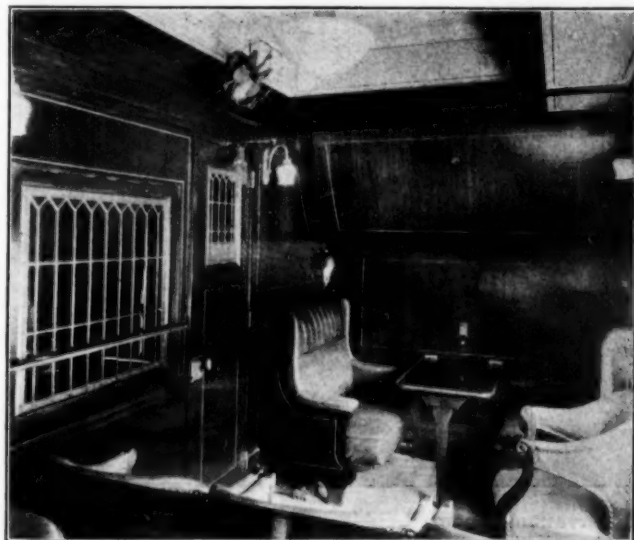
Five folding chairs and six camp stools are provided for the rear platform, giving accommodations for 11 people. When not in use, the chairs are stored in the locker adjacent to the women's wash room. Fourteen comfortable lounging chairs are provided in the main rear compartment of the car. This room is equipped with two electrically-driven exhaust fans, in addition to three ceiling paddle fans and the usual deck ventilators. At the for-



A Fully Equipped Barber Shop Is Provided

ings, etc., are plain and simple in form. However, panel effects are obtained by inlaying satin wood striping in the flat surfaces.

The rear observation platform, covered with sheet rubber consisting of blue and gray blocks laid diagonally, is provided with an overhead dome electrically lighted, to give a higher ceiling effect than if the ceiling were flat. The dome is finished in a light cream color and presents a particularly pleasing appearance when lighted.



One End of the Attractively Decorated Smoking Room

ward end of this compartment is placed a unique bookcase or magazine rack. As will be seen from one of the illustrations, this case has the appearance of a fireplace mantel, being provided with a shelf on the top and a number of adjustable shelves within the case placed at an angle for receiving the magazines. The front of the case is equipped with a cover similar to that of a roll top desk, which can be pulled down and locked so as to guard against the loss of magazines when the car is not in use. Above the bookcase is a grill to provide a good circulation of air between the main observation compartment and the writing room.

The writing room is provided with a flat top writing table with accommodations for two people. A paddle fan is placed in the center of the ceiling.

The buffet is conveniently arranged for quick service and as an up-to-date development, includes a soda fountain. The attendant in charge serves the usual mineral waters, beverages, cigars and cigarettes to passengers, and is also prepared to serve ice cream, ice cream sodas, sundaes, parfaits, malted milks and other fountain specialties. This service has proved very popular.

## Smoking Room Has Two Compartments

The smoking room is of an unusual arrangement in that it consists of two distinct compartments separated by a rail at the center. By having one large room divided

in this manner the appearance of cramping is avoided and a good circulation of the air is obtained. At the ends of the smoking room are berth sections which are used at night by the barber and porters. During the day these sections are well adapted for the use of card parties or for anyone desiring to use the portable tables, which are placed between the berth seats. Each half of the smoking room provides accommodations for eight people, or a total of 16 people. With this arrangement the porter enters the smoking room compartments from the corridor and can readily serve any of the occupants without disturbing other passengers, a feature much

the window and door leading to the women's lounge compartment. It will be noted that the corridor is so arranged at the forward entrance of the car that there is ample room for passengers entering and leaving the car. There is no platform on the forward end of the car, passengers using the platform and steps of the next car ahead.

Carpet, of special design made by W. & J. Sloane, New York, is used in the main observation compartment, writing room and women's lounge room. Sheet rubber tiling, used on the platform, passageway, smoking room and barber shop, is furnished by the United States Rubber Company.

#### Golden Brown and Blue Colors

The color scheme of the cars is a golden brown and blue with enough of the other brighter colors to add interest and accents. The same color that is used in the upholstery is repeated in different form in the design of the carpets. The upholstery material is said to be the first of its kind ever used. The block print, designed especially for the Union Pacific observation cars was made by hand blocking directly upon the mohair, by L. C. Chase & Co.

The printing itself is not so unusual, but an over-embossed design is used to soften the lines and to make the pattern more beautiful when finished. The same over-embossed design is applied to three different upholstery materials used in the car. There are stripes reversing the color schemes for some of the chairs and some of them have a plain blue with the embossed design in evidence. The carpet shows the same colors as used in the upholstery only in deeper values. To guard against a monotonous effect, a considerable degree of variety has been worked into the decorative treatment. Nevertheless, the design adheres to a single motif assuring a unity of the whole.

Particular attention has been given to the question of providing equipment to give the desired lighting effects in the cars. Underframe axle lighting equipment, fixtures, fans and switchboards, furnished by the Safety Car Heating & Lighting Company, are used, the lighting generators being of 4-kw. capacity, of the latest rolled steel magnet frame type, assembled on right-hand off center line type suspensions. The weight of this rolled steel type of magnet frame reduces the total weight of such generators approximately 10 per cent under that of the old cast steel frame type and because of being lighter, longer belt life is obtained.

#### Generator Regulators

The generator regulators which control the output of the generators are equipped with main switches which close at one-half volt above that of the battery over a wide range, open with small reverse current without arcing and require no carbon brake. A regulator holds the lamp voltage to that for which the lamp is designed to operate, preventing loss of illumination through low voltage and decrease of lamp life through high voltage. The switchboards are the Union Pacific standard 10-



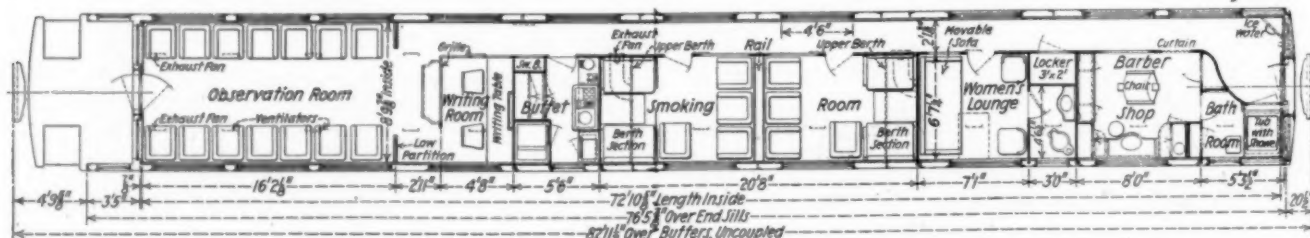
Observation Room Looking Toward the Bookcase and Writing Room

appreciated by the traveling public. An electrically-driven exhaust fan is provided for the quick removal of smoke and foul air from this compartment and in addition, there is a ceiling paddle fan.

The women's lounge compartment is provided with toilet facilities and equipped with a comfortable davenport and chairs. This compartment is also provided with an electrically-driven exhaust fan in addition to the usual deck ventilators.

The barber shop is fully equipped and has in conjunction a bathroom of ample size, providing both tub and shower features. The barber, especially trained to perform tonsorial service en route, also performs valet service and is prepared to clean and press clothes.

In the partition and doors between the corridor and the several compartments there are leaded glass windows, the glass being clear in all cases with the exception of



Floor Plan of the New Union Pacific 83-ft. Steel Observation Car



circuit type, equipped with ampere-hour meters which indicate the state of charge of the batteries. The storage batteries employed are furnished by the Edison Storage Battery Company.

The observation room is effectively lighted with three Safety semi-direct pendants with light density opal bowls supplemented by two-light side brackets, three on either side and two similar one-light brackets especially designed for the corners, as well as two one-light brackets placed over the writing desk.

The buffet is appropriately illuminated by one center pendant with light density opal shade. The smoking rooms are well lighted by two semi-indirect center fixtures with light density opal bowls, supplemented by two two-light and four one-light brackets, all of the same design as those in the observation rooms. The women's lounging room and barber shop also have the same type of fixtures. Passageways are lighted by five small deck fixtures with attractive Pearla glassware and the observation platform with one larger deck fixture with light density opal bowl.

#### Our Specialties

Commonwealth body bolsters and truck castings are used, and the trucks are fitted with Simplex clasp brakes and Miner safety bolster locking center pins. The cars are fitted with vapor heating equipment.

## Report on Gallitzin Derailment

THE Interstate Commerce Commission has issued a report, signed by W. P. Borland, director of the Bureau of Safety, on the derailment of east-bound passenger train No. 28 of the Pennsylvania, near Gallitzin, Pa., on the morning of August 29, about 2:23 o'clock, when one engineman and one fireman were killed and three employees were injured. This derailment was reported in the *Railway Age* of September 3, page 458, which report, however, was incorrect in saying that the train was running on track No. 1; it was on track No. 2. As stated in our report, the  $8\frac{1}{2}$  deg. curve on which this derailment occurred, was the scene of a similar accident on April 27, 1921, and again on December 19, 1925; and the present report says that the condition of the track was found to be similar to what it had been in April, 1921.

[The Public Service Commission of Pennsylvania, which investigated this case in conjunction with the Federal Bureau, has recommended that the railroad company limit the speed of trains on this descending grade to 20 miles an hour instead of 30 as heretofore.]

The derailment occurred at a point about one mile east of SF block station. Approaching this point from the west, the grade, descending, varies from 1.42 per cent to 2.36 per cent and is 1.73 per cent at the point where the engine ran off the rails.

Concerning the track, the report says "the curve on which the accident occurred begins in a rock cut and then extends out on to a fill which is about 120 ft. in height. The track at this point is laid with 130-lb. rails, 39 ft. in length, with 22 or 23 ties to the rail-length, tie-plated, and is double-spiked on the inside of each rail and triplesiked on the outside, with six rail anchors to each rail length. This portion of the track was raised and ballasted in June of this year, at which time it was also retied and the spacing of the ties corrected where necessary; the ballast is of crushed stone, filled in level with the tops of the ties. The general maintenance of the track is good."

The surviving engineman estimated the speed of No. 28 at 25 miles an hour, but the conductor thought 40 miles an hour more nearly correct. The inspector believes, from the condition of the wrecked engines and cars, that it was more than 40 miles an hour.

A track walker had passed westward along track No. 2 about four hours prior to the derailment at which time he noticed nothing wrong.

Measuring the gage of the track, at intervals of 11 ft. for some distance west of the point of derailment, the elevation of the outer rail was found to be from  $3\frac{3}{4}$  in. to  $3\frac{7}{8}$  in. and the gage from 4 ft.  $8\frac{3}{4}$  in. to 4 ft.  $8\frac{3}{8}$  in. There were five points where the gage was less than 4 ft.  $8\frac{1}{2}$  in. and tight gage is deemed to have been an element in the cause of the derailment. The average elevation,  $3\frac{3}{4}$  in., is also held to be too small. The elevation found at the investigation in April, 1921, was about  $4\frac{1}{4}$  in. The combination of a curve of  $8\frac{1}{2}$  deg. and an elevation of about 4 in. is held to have provided too low a margin of safety for the speed at which this train was running. Attention is called to the fact that on the Lehigh Valley, near Mountain Top, Pa., on February 16, 1926, where an accident occurred, the curvature was found to be eight degrees; gage 4 ft. 9 in., super-elevation  $6\frac{1}{4}$  in., and authorized speed 30 miles an hour.

## S. P. Handles Record Tonnage

THE Southern Pacific established a new heavy tonnage record during September, when 54,107 cars were moved over the Sierra Nevada mountains, an average of 1,803 cars per day. This is 7,875 cars more than were handled over this route during any previous month in the history of the company, and 163 more cars per day than the previous daily average for September.

On September 26 a new record for a single day was established in moving trains on the same line. Within 24 hours, 57 trains, not including local freight and passenger trains, passed Summit station. On the same day a new record was also established when 2,434 cars passed Summit, the previous high record being made on October 17 last year with 2,009 cars.

The lateness of the grape shipping season this year resulted in a flood of shipments moving late in September and caused a difficult operating problem. Special crews and locomotives were concentrated on the main line and on the feeder lines radiating in all directions from the main yards at Sacramento and Roseville. From now on it is expected that the tonnage will decrease and that shipments will return to normal. The major task in the movement has been to keep a steady westward flow of empty cars so that there would be sufficient cars to meet the loading requirements of the growers.

At the beginning of the season the Pacific Fruit Express had 32,000 refrigerator cars in reserve to meet the demands of shippers. This number was 4,000 cars in excess of any previous reserve car supply gathered on the Coast for harvest shipments. Since the beginning of the shipping season a sufficient car supply has been maintained to meet demands of all shippers.

THE PUBLIC UTILITIES COMMISSION of Ohio has filed a complaint with the Interstate Commerce Commission asking it to require the use of automatic or foot-power fire doors on locomotives.

# Rate Regulation and Capital Requirements

*John J. Esch, I. C. C. chairman, in statement to Railway Business Association, criticizes carriers for not initiating rate relief measures*

“WHILE the commission is charged by law with the duty of initiating rates which will yield as nearly as may be a fair return, nevertheless the principal burden of preparing data for the commission to enable it to carry out this duty must perforce rest upon the carriers,” says John J. Esch, chairman of the Interstate Commerce Commission, in a statement to the Railway Business Association which the president of that organization, Alba B. Johnson, mailed to members on Monday. “Although free under the law to file petitions with the commission for investigations of existing rate levels,” Mr. Esch’s statement continues, “the only carriers who have seen fit to present such a petition since 1922 are those in the western district who prepared the petition in 1926. . . . Carriers are also free to initiate and publish schedules of rates between particular points or on particular commodities or throughout their respective territories.” Such schedules if filed in accordance with the provisions of law, Mr. Esch adds, “become effective 30 days after filing unless suspended by the commission for investigation. Although possessing this right, practically no attempts have been initiated by eastern or southern carriers to bring about any general increases in rates although in some instances they have advocated general increases as a result of proceedings initiated by shippers.”

An officer of the Railway Business Association had requested of each commissioner citations to aid in preparing a paper for the association’s annual meeting in New York on November 16 on the subject “Can the Interstate Commerce Commission Regulate Rates and Revenue in Accordance with Traffic Forecasts and Facility Estimates?” Such commissioners as were accessible in Washington arranged with Chairman Esch to make a single informal reply for them all. The reference to rate advances occurs in an exposition of regulation in general. Mr. Esch volunteers no suggestion that applications for advances would now be timely.

In his letter of transmission to members, President Johnson says:

“Rate changes are made in conference between shippers and railway officers, or in classification committees under supervision of the commission, or in proceedings on proposals for increases or reductions or for adjustments involving both advances and reductions. The Railway Business Association has never expressed an opinion about a rate or rate level and expresses none now. The association is not authorized to speak for the carriers, whose officers and representatives will become aware of this publication simultaneously with everybody else. It seems timely, however, to observe that if in the course of those several rate-making processes the carriers have found an atmosphere which they felt was unpropitious for seeking advances, and if the underlying cause of that atmosphere was a prevalent belief that facilities and hence inflow of capital were adequate, the analysis of current surplus in tractive power and freight car capacity communicated to you on October 29 under the title ‘Railway Capital Programs’ would seem to provide occasion for a fresh appraisal of circumstance.”

In his analysis of October 30, published in the *Railway Age* of November 5, page 903, under the title, “Equipment Installations Less,” Mr. Johnson expressed the conclusion that a new peak in car loadings showing an increase over last high equal to that between the peaks of 1925 and 1926 would wipe out the surplus locomotive tractive effort, which he declared had actually decreased in nine months to October 1, and that in car capacity a still smaller car-loading increase over the last peak would exhaust the margin, which in nine months had only increased by one-quarter of one per cent. Mr. Esch in his statement noted that it was not to be considered as any form expression on the part of the commission itself, but merely as an expression based upon information which had been given to him by the bureaus of the commission. The statement follows nearly in full:

## Rate Regulation as the Commission Sees It

You desire light on the questions of how rapidly traffic will expand, and how much of various kinds of facilities and consequent investment will be required, and how high the rate level should be to enable the railroads to raise this amount of new capital.

An estimate of amount of investment required in a given period in the future involves guesses on the following points:

1. How much will traffic increase?
2. To what extent will new inventions make a dollar of investment more efficient?
3. To what extent will prices change?
4. To what extent will the public demand unproductive investments, such as, crossing elevation, more luxurious stations, etc.?

5. To what extent will other forms of transportation take away business?
6. To what extent will electrification be introduced?

The best thing a regulating commission can do is to look ahead for only a short period at a time. It can ask the railway executives from time to time whether the existing and immediately prospective traffic is being adequately handled and whether they are able to get the funds required for capital purposes. Such information together with the records as to railroad earnings, dividends, and stock-market prices may to some extent enable the commission to judge whether the rate level is adequate or not. Such information is brought before the commission in the leading cases involving the general level of rates.



It should be noted that a part of the money required for capital expenditures each year comes out of revenues. What is required for replacement is charged to operating expenses, and a part of the new facilities are paid out of appropriations from income. In other words, the capitalization does not have to grow as fast each year as does the property account. The investment increase, 1920-1925, averaged 572 millions a year, and in the same period the increase in securities outstanding averaged 340 millions.

Although the commission in the *O'Fallon* case has stated the general principles which must govern in its treatment of the questions of railroad construction and financing that come before it, it is limited in the application of those principles by existing conditions. If the territory over which the commission has jurisdiction were undeveloped as to resources and transportation facilities, it might be possible for the commission to establish a general program for the provision of facilities and their maintenance and upkeep which would be fully responsive to the principles it has announced and which in fact are quite obviously sound. As a matter of fact, however, the commission when first established was confronted by existing conditions which compelled it to apply any policy or theory which it may have had in a piece-meal manner, and those conditions have existed until the present time. While certain territories are over-supplied with facilities and others are undersupplied, there is scarcely any substantial portion of the country which may be said to be entirely without railroad facilities. Under these circumstances, therefore, since the commission has had authority over the extension of facilities it has been necessary to deal with local and individual problems, many of which have only a very general relationship to the national transportation problem.

As it is with the facilities themselves, so it is with the allied problems of traffic and rates. Owing to conditions which antedate the commission's authority, the earnings of the carriers show the greatest variety, ranging from ruinous losses to prosperity far beyond any reasonable business requirements. All that can be done is to deal with these questions as they arise, applying, so far as practicable, the governing general principles which apparently have suggested this inquiry.

If the commission were able to work out on a scientific basis a correct estimate of increase in traffic and necessary facilities for the country generally it would no doubt be an ideal situation, but the commercial history of the country, showing, as it does, alternate waves of prosperity and depression as a whole, and prosperity in certain sections accompanied by depression in other sections, does not offer any encouragement to any general program based upon forecast other than is embraced in the application of the general policy of liberality in dealing with individual cases as they arise. Consolidation of the carriers, with special attention to the case of the weak lines, will simplify the problem and in the proportion to which it is made effective will facilitate the application of correct principles in regulation.

#### Commission Already on Record in Rate Decisions

So far as replies to your inquiries would necessitate a declaration of policy, the commission has no opinions to express, declarations of policy being within the jurisdiction of Congress. What the commission may be expected to do in the future can best be determined by its action in the past. I am, therefore, giving you in what follows a resumé of the decisions of the commission which most closely relate to your inquiries.

Stated in general terms, the Interstate Commerce Act

provides that the Interstate Commerce Commission shall initiate and modify rates in such manner as to produce as nearly as may be a fair return upon the value of the property used by the carriers. The commission is charged with the duty of determining the value to be used as a base for such fair return as well as the percentage of return. Evidently the Congress had two main objects in view in the adoption of these provisions:

(a) That if the carriers are to be subjected to regulation of their charges and practices, they should in all justice be permitted under such regulation to earn a fair return for the services performed by them;

(b) That it is in the public interest that the transportation facilities of the country be kept in a condition to meet adequately the needs of commerce, and that this end may be accomplished only by allowing carriers to earn a fair return, thus placing them in position to attract the necessary capital to provide such facilities.

Immediately after the passage of those provisions of law, the commission undertook its first investigation thereunder. Its decision was rendered July 29, 1920, and is known as *Increased Rates*, 1920, 58 I.C.C. 220. In that decision the commission considered its duty under the law and the procedure to be followed by it in carrying out that duty. Statistics of past operation and the revenue results thereof were obtained from the carriers, together with estimates for the future. In particular, the results of operation for the latest available calendar year were recast on the basis of the best estimates available of the conditions which would ensue in the future. Consideration was given to the available facts with respect to the needs of carriers for additional capital to provide adequate facilities.

The only other general proceeding in which this situation has been considered by the commission was initiated early in 1922 and was decided May 16, of that year. *Reduced Rates*, 1922, 68 I.C.C. 76. Again the commission developed to the best of its ability a record containing facts as to the probable revenue needs of the carriers in the immediate future, the probable traffic to be handled and the probable revenue to be derived from various levels of rates.

Manifestly, forecasts of the future are extremely difficult to make with accuracy, and no matter how careful or complete an analysis of the situation may be made, estimates may prove wide of the mark. Both the carriers and the commission have considered that the best way to approach the problem of future needs is to develop actual performance in the past and then attempt to modify the results of such performance by known or estimated factors which in the future would tend to change conditions. Such estimates and forecasts must give consideration, among other things, to the following:

- (a) To crop prospects;
- (b) To general world conditions;
- (c) To the probable condition of the money market in the United States and in the world as a whole;
- (d) To the probable industrial situation;
- (e) To probable shifts in traffic due to changing industrial conditions; and
- (f) To probable commodity price levels affecting the cost of maintenance, improvements, and betterments needed to maintain the transportation machine in an adequate condition.

Adequate answers to these questions involve assembly of the views of men well posted along particular lines, but the views of different authorities will vary materially on many of these points and even the consensus of such opinion may eventually prove to have been considerably wide of the mark.

While the commission is charged by law with the duty of initiating rates which will yield as nearly as

may be a fair return, nevertheless the principal burden of preparing data for the commission to enable it to carry out this duty must perforce rest upon the carriers. They have large and able organizations and have the financial means to supplement such organizations in the preparation of information bearing upon the necessary lines of inquiry. Except in the two general proceedings mentioned, no country-wide assembly of facts of the above character has been presented to the commission since the passage of the present law, although in 1926 carriers in the western district attempted to justify general increases in rates in that district and in that attempt presented data bearing upon present and prospective conditions in that territory. The decision of the commission on that application was rendered July 14, 1926, *Revenues in Western District*, 113, I.C.C. 3.

Carriers of the eastern and southern districts have in the past two or three years been reasonably prosperous and even those in the western district, although falling considerably short of the fair return contemplated, have been in reasonably good condition and their situation is now improving. Large sums have been spent by nearly all carriers on maintenance, improvements, and betterments. Service has been greatly improved and has proved adequate to meet the needs of commerce. The more expeditions and dependable service rendered by carriers in recent years has resulted in a general tendency on the part of industries to maintain comparatively low stocks of raw materials and manufactured products, as they rely upon their ability to obtain additional supplies on comparatively short notice without transportation delay.

This has to a marked degree lessened the amount of capital invested in stocks of raw materials and manufactured goods and undoubtedly has had some effect in bringing about the very easy money market which has generally obtained in the last year.

Rate stability is an important element in industrial progress. Manifestly if rate levels are continually to change, the ability to make contracts for future performance is seriously impaired. This situation is discussed in the decision in *Reduced Rates*, 1922. Although free under the law to file petitions with the commission for investigations of existing rate levels, the only carriers who have seen fit to present such a petition since 1922 are those in the western district who prepared the petition of 1926 to which reference is made above. The carriers are also free to initiate and publish schedules of rates either between particular points or on particular commodities or throughout their respective territories. Such schedules if filed in accordance with the provisions of law become effective 30 days after filing unless suspended by the commission for investigation. Although possessing this right, practically no attempts have been initiated by eastern or southern carriers to bring about any general increases in rates, although in some instances they have advocated general increases as a result of proceedings initiated by shippers. Indeed, although the commission's decision in the western case rendered in July, 1926, indicates in a general way that the carriers proved their contention to the extent of showing that some rates in that part of the West ordinarily known as western trunk-line territory (east of the Rocky Mountains, west of Lake Michigan and the Illinois-Indiana State line, and north of the northern boundaries of Oklahoma and Arkansas) are too low and may with propriety be increased in order to bring up the aggregate revenue, no concerted action has been taken by the carriers to increase such rates, except that there is now pending a proceeding initiated by the commission at the

request of the carriers into the class rates in that territory.

#### Hoch-Smith Resolution

The Hoch-Smith Resolution, passed in January, 1925, directs the commission to readjust the rate structure so as to bring about a more harmonious relationship of rates, particularly as between commodities and particularly with respect to products of agriculture as compared with other commodities. Acting under that resolution, the commission now has pending a general investigation known as *Rate Structure Investigation*, No. 17000. One of its acts in that proceeding was to send out questionnaires to carriers with respect to several important commodities asking for various kinds of information, including data as to what, if any, rates on such commodities or on other traffic might properly be increased.

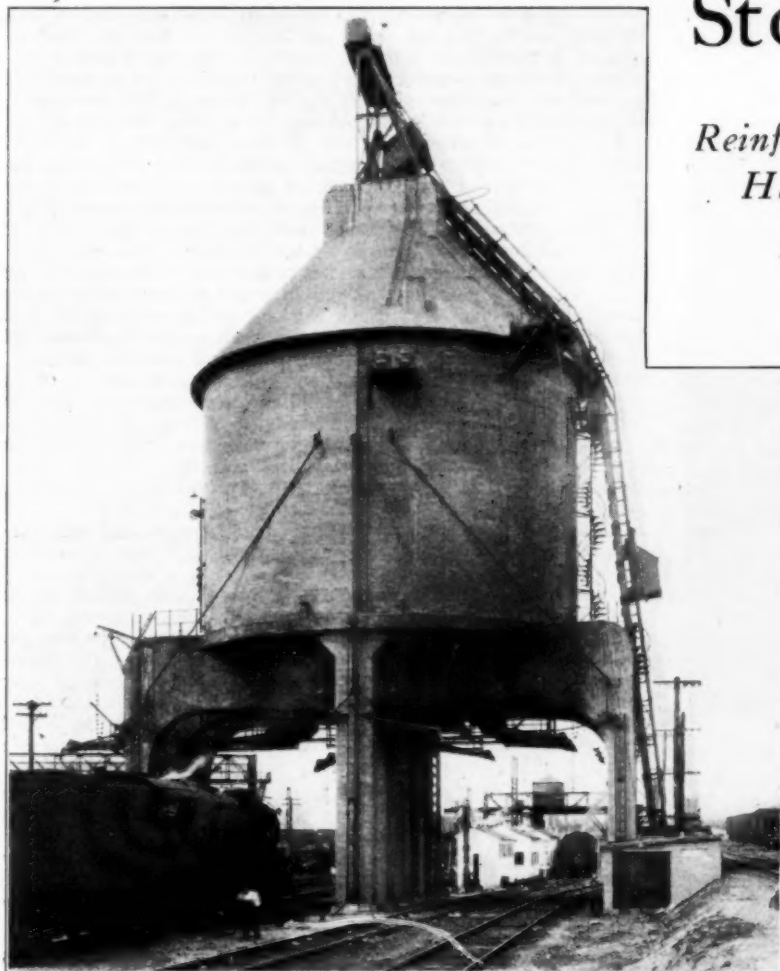
Very little definite or concrete information was furnished by the carriers in answer to that question, most of them contenting themselves with the answer that if rates on agricultural products should be reduced pursuant to the Hoch-Smith resolution, the needed additional revenue to compensate therefor should be obtained by blanket increases on all remaining traffic, regardless of the measure of the rates thereon, although the commission in the decision in the western case expressed its disapproval of that method except to meet emergencies, indicating that before the necessity of a general increase of all rates can fairly be determined, those rates which are not paying their fair share of the transportation burden should be increased to a proper basis rather than that blanket increases should be placed on all traffic, some of which may now be paying rates equal to or in excess of reasonable maximum rates.

The commission does not have available the necessary funds or facilities to enable it to prepare currently adequate estimates of future revenue and capital needs, and even if it were in a position to establish a forecasting bureau for the purpose of making, and giving publicity to, more adequate and frequent estimates than have been considered necessary in the past, the need for rate stability would seem to negative the desirability of such a course. As above indicated, the carriers are in a better position to assemble the necessary data with a view to having it available if and when the situation appears to be such as to warrant further consideration by the commission of the general rate levels. Where proceedings which may entail material changes in general rate levels are continually pending before the commission, they create a feeling of uncertainty in business circles, thus tending to have the effect of lessening traffic and consequently of diminishing the revenues of the carriers as well as adversely affecting general prosperity. The making of yearly or other periodic forecasts by the commission would be subject to similar objections.

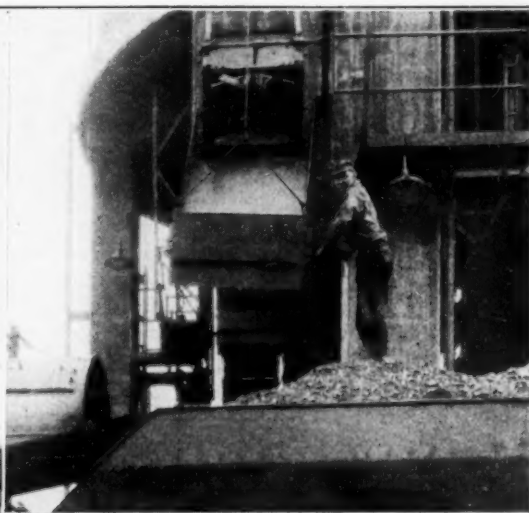
Speaking concretely of the question in which you are primarily interested, it would seem that there is much to commend the fixation of rates, having in mind, among other things, the factors referred to above. It also would appear that there are many considerations indicating that it would be in the interest of the carriers for them to initiate nation-wide studies to develop data as adequate as possible with respect to those factors, but the question of how often it would be in the interest of either the carriers or the public to have formal investigations initiated by the commission with a view to changes in general rate levels to meet probable future conditions is one which can only be decided based upon conditions existing at any given time.



# New Coaling Station Has 2400 Tons Storage Capacity



*Reinforced Concrete Plant of the New Haven at Cedar Hill Serves Locomotives on Five Tracks*



*The New Coaling Station—At the Right, One of the Side-Cut, Non-Skim Coaling Gates*

**T**HE New York, New Haven & Hartford recently placed in operation a coaling station at its Cedar Hill terminal which is rated as the largest single modern facility of its kind in the world. It has a storage bin with a capacity of 2,400 tons of mine run bituminous coal in addition to a dry sand bin of 15 tons capacity. This plant was erected in record time following the destruction of existing coaling facilities in a fire.

The new station, which was furnished and erected complete by the Roberts & Schaefer Company, is the largest installation of the newest type of coaling plant designed and built by that company. It is a built-in-place reinforced concrete structure consisting of a cylindrical coal pocket, 55 ft. in diameter, supported on a heavy frame tower designed to provide two passageways underneath, each of which is of adequate width and height to accommodate two coaling tracks. Coal is also delivered to locomotives on a fifth track located beyond one side of the tower. The coal pocket has a conical roof terminating in duplicate hatches for the delivery of coal by elevating buckets from a track hopper. The total height of the structure is 102 ft.

An idea of the size of the structure is to be had from a comparison with the locomotive shown in the general view of the station. The supporting tower consists of three rigid frames spanning transversely over the four tracks, each frame consisting of a reinforced

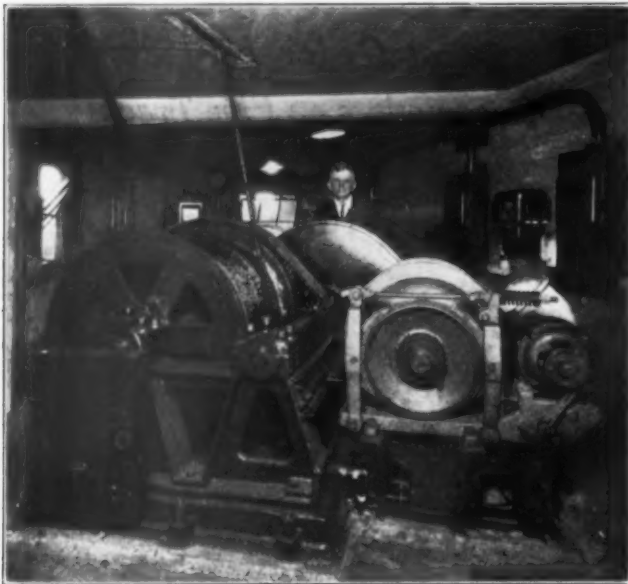
concrete girder, 9 ft. 7 in. high by 3 ft. 6 in. wide, continuous over two spans and supported by two outside columns, 3 ft. 6 in. square and a center column 3 ft. 6 in. by 5 ft. in section. In addition, there are two outer columns, 5 ft. by 2 ft. 6 in. in section in the center row to support the portions of the pocket which project beyond the sides of the two outer girders.

Coal is delivered to the station in a track hopper 20 ft. long and of sufficient width to receive the contents from cars on two receiving tracks 13 ft. center to center. From the hopper the coal is fed through two simplex automatic loaders to two 2½-ton steel buckets, each of which elevates coal at the rate of 90 tons per hour, giving a maximum capacity of 180 tons an hour when both units are in operation. The skips operate on roller bearing wheels that run on a structural steel inclined runway for the delivery of the coal to the hatches at the top of the pocket. This runway is entirely in the open and is readily accessible by ladder and stairway for inspection and maintenance; however, the drums and the other moving parts are protected from the elements.

The hoisting machinery, which is housed in a concrete shed adjacent to the track hopper, is of the type installed in all new coaling stations built by the New Haven. Each unit consists of a direct-connected, cast steel geared type of hoist mounted on a common base with the motor. The hoists are equipped with push-button type, Cutler-Hammer automatic controllers which provide for

continuous operation without attention from the operator. A solenoid brake serves to hold the load when the current is cut out. Special safety devices are provided to prevent accidents due to overwind or slack cable.

Two gate and apron fixtures are provided for the delivery of coal to the locomotives on each track, those for the four tracks under the structure being of the undercut type and those for the fifth track being of a new side-



One of the Automatic Electrically-Operated Hoists in the Machinery House

cut non-skim type which has the advantage of a thorough mixture of the coal delivered to the locomotives and provides for the positive control of the gate by the operator. Special weatherproof valves are provided for the supply of sand to locomotives on any of the coaling tracks from the overhead dry sand storage bin.

This station was designed and constructed under the direction of Edward Gagel, chief engineer, and R. L. Pearson, engineer maintenance of way, of the New York, New Haven & Hartford.

## The Protection of Men Working Under Traffic

**I**N accordance with the practice which has prevailed in the American Railway Bridge and Building Association for several years of giving consideration to one safety subject at each convention, a report was presented at the Minneapolis convention on October 20 on the Protection of Men Doing Work Under Traffic by a committee of which G. S. Crites, division engineer, Baltimore & Ohio, Baltimore, Md., was chairman. This report was supplemented by a paper presented by F. C. Baluss, engineer of bridges and buildings, Duluth, Missabe & Northern, Duluth, Minn. Both the report and paper are abstracted below.

Men doing work under traffic will get as much protection as the management demands or the men take. The supervisory officer has the responsibility of seeing that all concerned understand and obey the rules. The officer reaches the men largely through his foremen and generally speaking, the foremen will be as good as the officer over them insists that they be. A man should be required to pass a written examination on the rules and instructions covering the work of foremen before he is promoted to a foremanship or as soon thereafter as possible. This written examination should be made a part of such fore-

man's personal record and periodical examinations should also be held to determine whether or not the foremen are keeping themselves up to date.

Work to be done properly under traffic must be very carefully planned, programmed and scheduled. Generally, climatic conditions will be the ruling factor in scheduling bridge and building work, but on some roads traffic conditions outrate seasons in setting the schedule for the bridge and building program. Wherever possible, work under traffic should be scheduled to be done when the traffic is the lightest and then, of course, the problem of protecting men doing the work is partially solved.

Contiguous to cities there are often periods during the night when there are few or no trains scheduled. Good lighting systems are now available, making it possible to furnish proper illumination for almost any character of work and thus it will be found expedient, economical and safe to fit the work to train schedules although to do so will throw the working hours into the night. Often tunnel work that has to be done under artificial light is done during daylight hours when train schedules are entirely unfavorable. Such work should be done to fit train schedules. Renewal and maintenance work around highway and street crossings, under-grade and over-grade electric crossings, passenger terminals, back shops and in general around or about any structure or facility not heavily used at night can best be scheduled when such facilities are being used little or not at all.

Most work has to be done under more or less traffic, no matter how carefully planned and scheduled, and the following practices have been found economical, expedient and safe on some roads:

The issuance of train orders directing trains to approach certain locations under control where men are doing work that may not allow them to clear trains readily.

The installation of telephones by which the operators at stations on each side of the work advise the watchmen as to the approach of trains. In one case of extensive bridge renewal work a manually-controlled block was established for the working area with an operator at each end of the block. One responsible man saw to it that the men were in the clear and the track unobstructed before the trains were given the signal to proceed. Such a system is expensive to install and operate but its use is justified under heavy traffic.

In obscure locations, such as on sharp curves, in tunnels, cuts or alongside buildings or in any place where approaching trains cannot be seen for some distance, the prevailing practices are to station a lookout or lookouts to warn the men doing work under traffic of approaching trains. The stationing of lookouts is also used where men are at work taking down loose overhanging rocks, trees, etc.

The conclusions of the committee were summarized as follows:

1. The managements should insist that men doing work under traffic be protected.
2. Supervisory officers should know by trial and examinations that foremen are safe and capable.
3. Work should be so programmed and scheduled that it will be done under as light traffic as possible.
4. Avoid working close to high tension electrical lines carrying power.
5. Use flag protection where necessary.
6. Resort to train orders or general orders where protection can be afforded in this manner.
7. Where the work justifies it, install operators or watchmen with communicative signal systems.
8. On very important lines protect men and traffic with block systems.
9. Use lookouts where needed.

The American Railway Bridge and Building Association took up the matter of accident prevention in 1923 and at the 1925 convention in Buffalo, a report was presented on the reduction of accidents to employees. Four years have now elapsed and it seems pertinent at this time to examine the record and see what has been accomplished. For this purpose the data in the 1925 report have been extended to include 1926, the latest year for which statistics are available.

The number of employees per employee injured in all classes of railway work shows a gratifying increase since 1923, but on the other hand, there is a slight decrease in the number of employees per employee killed since 1924. The curve representing the latter, however, indicates a consistent improvement over a period of 37 years and a slight reduction is noted in accidents to bridge and building employees.

Other data were studied for various classes of employment, those selected having the larger totals of man-hours. Bridge and building painters and maintenance of way laborers are responsible for the higher rates of fatalities while the laborers and carpenters run up the higher rates in casualties. An attempt has been made to determine the kinds and causes of the high



rates, but unfortunately, the Interstate Commerce Commission, the principal source of railroad accident statistics, does not require this information of the railroads in non-train accidents. Information should be gathered and a study made by the supervisors of safety so that appropriate corrective measures can be applied. If such study is made it will probably be found that falls of persons and objects are two large sources of the higher casualty rates. The subject of ladders and scaffolds was very fully discussed in the 1925 report. It would be well for supervisory men in bridge and building work to analyze the accidents which come under their immediate notice and for which they are in a way responsible.

The use of motor cars is increasing rapidly and is found to be the cause of a large number of fatalities and casualties. Few railroads require motor cars to be operated under train orders and it is a question if such operation would prove successful. It would seem that motor car users must continue to safeguard their movements by time-card and by the latest information obtainable regarding trains.

Possibly the use of portable telephones, carried on the cars, would be of aid on roads which are equipped with telephone lines, but there will be the grave danger of overloading the dispatchers. Supervisory men are vitally concerned in keeping this economical transportation for their crews and should not allow the matter to get out of bounds. Corrective measures should be applied immediately when necessary and adequate rules should be adopted and enforced.

A further study of statistics of accidents to bridge and building men discloses that, by the end of 1926, a lower rate of fatalities had been made than the proposed rate of 35 per cent reduction by 1930. However, as casualties or injuries not resulting in death appear to average 800 or 900 times greater than injuries resulting in death, this is not so reassuring, for the rate of injuries per million man-hours remained almost constant for the years 1924 and 1925 and by the end of 1926 it was more nearly paralleling the 35 per cent reduction curve, but considerably higher.

The deductions outlined here are commended for earnest study in order that bridge and building men may get in line with other railroad occupations where better accident reduction rates are being made.

The discussion of this report indicated the growing appreciation on the part of bridge and building supervisory officers of their responsibility for the safety records of their departments. C. Ettinger (I. C.), J. P. Wood (P. M.) and others attributed many of the accidents to the high turnover in men and their lack of experience, which contention was challenged by C. R. Knowles (I. C.), J. S. Robinson (C. & N. W.) and others, who cited a number of instances where accidents had occurred by reason of the carelessness of experienced men. T. Turnbull (A. A.) stated that his road had put up a silver cup last year to be awarded to that branch of the service which made the greatest improvement in reportable injuries, the maintenance of way department winning the cup. Mr. Turnbull described an elaboration of this plan which he has in contemplation, whereby a record will be made of all injuries reportable and otherwise in each gang and the gangs rated. In discussing the operation of motor cars, J. P. Wood advocated the equipping of every bridge gang with a portable telephone. C. Ettinger described the practice in effect on his road of selecting men from the gangs to attend the monthly safety meetings, this recognition appealing to their pride and causing them to return to their gangs enthusiastic advocates of the safety program. W. A. Battey (U. P.) described the practices in effect on that road which have placed it in the lead in safety matters. Among other measures he stated that in every bridge gang from one to three of the older men are examined on the rules and are subject to call in case the foreman is called elsewhere or the work is divided at any time. Regardless of the minuteness of the injury an investigation is made of every accident. Attendance at safety meetings is compulsory among every supervisory officer. Standard plans are prepared for scaffolding and similar equipment, which plans are followed in detail. Motor cars are inspected daily, while scaffolding, ropes, planks, etc., are

inspected at frequent and regular intervals. Supervisory officers are required to go over the details of all work with their foremen to know that they understand the minutest details, foremen being held responsible at all times for the safety of their men. L. A. Cowser (M. P.) stated that inspection has shown that many accidents can be prevented by cautioning the men when they start to work each morning rather than disciplining them after an accident has occurred.

## Pennsylvania Supply Departments Occupy New Quarters

THE central purchasing bureau of the Pennsylvania and the general stores offices have been moved to a new 14-story office building which this company has erected near its station at West Philadelphia. In the new building, the two departments have been brought together on one floor, which is entirely devoted to their use. Well furnished accommodations for representatives of railway supply houses calling upon the purchasing department are provided in the new quarters, dictating machines have largely taken the place



The Pennsylvania's New Office Building at West Philadelphia

of stenographers and all letter writing, mailing and other office routine, including the preparation of orders for material, is largely reduced to a mechanical process in a co-ordinated service bureau.

The location of the offices of vice-president in charge of purchases and stores, the assistant to the vice-president, the general purchasing agent and the stores manager are not affected by the new arrangement. These offices remain in the Broad street station with other executive offices of the company, but the rearrangement embraces the entire organization of the purchasing agent and the general storekeeper in Philadelphia. In the new building, the store organization is all together and within easy access of the purchasing organization, giving

recognition to the principle of stores and purchasing departmental co-ordination.

#### Fine Reception Room

A feature of the purchasing department quarters is the accommodation provided for business callers. This department receives an average of 70 callers daily, ranging from the representatives of small concerns to the executive of the largest business houses. The Pennsylvania has taken the position that these men are all prospective, if not actual patrons and at all events comprise an important part of the public, towards which the road may well extend the courtesies and hospitalities befitting of relations between gentlemen.

The reception room is 25 ft. by 25 ft. in area. On the floor is heavy Wilton carpet and the room is fur-

nished with 2 davenports, 4 large club chairs and 14 smaller club chairs, all upholstered in leather, and individual smoking stands. In the center is a large reading table carrying current copies of trade journals. A large globe atlas of the world is included and a telephone is installed for the convenience of those whose offices may want to get in touch with them after they leave headquarters. A uniformed attendant is stationed in this room to announce and usher in callers and also to mark on the register of callers both the time they reach the office and the time they are received. This register is examined regularly for any irregularities it may disclose in the handling of callers and as a result of its use it is seldom that any visitor is kept waiting over 15 min. for an interview.

In addition to the reception room, the quarters also provide a commodious board room where competitive bids for business, subject to the Clayton Anti-Trust Act are opened, and similar business is conducted. This room is entered both from the reception room and from the purchasing office, so that visitors can enter and leave it directly while, at the same time, the purchasing agent is afforded a private entrance and exit.

#### Consolidate All Letter Writing

When the Pennsylvania reorganized its supply work, a system of order making and despatching was established, designed to eliminate waste, time and effort; a co-ordinated service bureau was also established where

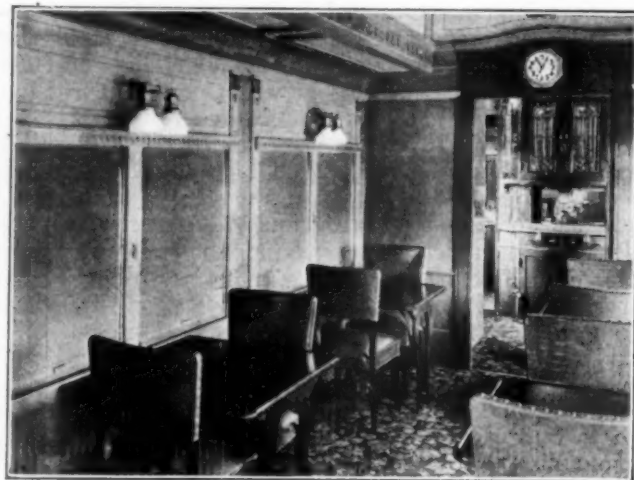
#### Purchasing Agent's Staff

The purchasing agent's staff consists of one assistant purchasing agent and four assistants to the purchasing agent, each in charge of a division of the material accounts; also one assistant to the purchasing agent in charge of personnel, a forester who supervises the company's large lumber inspection forces, and an office man-

ager. In the stores office, on the other hand, are three assistant general storekeepers, the office manager, and material and catalogue supervisors, all of whom have a more or less extensive correspondence, inter-departmentally and with points on the line.



A Partial View of the Reception Room of the Purchasing Department—Entrance to Conference Room at Extreme Right



Dining Cars of N. Y. C.'s "Twentieth Century Limited" Equipped with Ornamental Seth Thomas Clocks



# New Depreciation Hearings Begin

*N. I. T. League plan presented—Issue combined with discussion of new accounting classifications*

WASHINGTON, D. C.

THE National Industrial Traffic League and, in co-operation with it, the National Council of Traveling Salesmen's Associations, is taking a leading part in the hearings which started in Washington on Wednesday on the subjects of depreciation and the accounting classifications.

In the hearings, which are being conducted by Commissioner Joseph B. Eastman, three proceedings will be handled together, namely, the rehearings in the depreciation dockets Nos. 15,100 and 14,700 and consideration of the proposed revision of the accounting classifications, which matter has been designated as Ex parte 91.

The great interest in the three subjects was evidenced by the large attendance which taxed the capacity of the commission's main hearing room. Inasmuch as a large list of appearances has been entered by representatives of the railroads, the Federal Conference Committee on Federal Valuation, the Railway Accounting Officers Association, the Bell System, the National Association of Railroad and Utilities Commissioners, various state commissions, etc., it is expected that the hearing will last for several days. Depreciation will be taken up first and the revision of the accounting classifications later.

The first witness was John W. Roberts, president of the Roberts-Pettijohn-Wood Corporation of Chicago, who offered a plan for depreciation accounting having the support of the National Industrial Traffic League and the Traveling Salesmen's Associations. Mr. Roberts presented a so-called "alternative plan" for depreciation accounting which he claimed to include many improvements over the plan presented by the Commission in its depreciation order in docket No. 15,100, dated November 2, 1926.

The first part of Mr. Roberts' argument follows in abstract:

The public interests here appearing are unanimous in respectfully advocating that accounts of steam railways shall be kept and arranged so as to reflect the essential facts, first, as to the actual cost of the respective services currently rendered, and the revenues earned thereby, and, second, as to the periodic financial status of the carrier companies.

That is tantamount to saying that they are in favor of depreciation accounting, as it is commonly called. However, they are not in favor of depreciation accounting as it is commonly practiced; nor on the bases variously proposed in the proceedings which led up to the commission's order of November 2, 1926; nor in the manner which is prescribed in that order.

It is believed that the subject has not been thoroughly analyzed from the accounting point of view, and that it has not been sufficiently considered from the standpoint of the public's pecuniary interest. We believe there is a better and more equitable way of handling the problem than has yet been proposed.

Serious faults are perceived in the plan of depreciation accounting laid down in the commission's order. These faults are the result of departures from accounting principles, and the evasion of one difficulty to create another of more serious import. In important particulars it is believed that the prescribed procedure is in part arbitrary in the sense that it has no foundation in fact, and

that it is in part anticipatory in the sense that it is speculative, and in both cases, needlessly so. Under the commission's order opportunities still exist to make the accounts self-serving and under our present law there are important incentives for the carriers to do so at public expense. We believe that safeguards can be provided which will prevent any such results.

Regardless of definitions which may be attached to the terms "depreciation" and "depreciation expense," it is patent that the substance to be accounted for is the capacity of property to serve its intended purpose which represents the utility of the capital invested therein. In order to do justice to the situation, the accounting procedure must, perforce, take cognizance of every factor which affects the capacity in a way which can be measured for accounting purposes, and make proper disposition of the effects.

A clear distinction must be drawn between ability to serve and capacity to serve. Ability to serve is of course an attribute of capacity to serve. Capacity is an accountable quantity, while ability, in the sense referred to, is a quality which bespeaks efficiency, the degree of which should be disclosed as one of the logical results of accounting.

When it is new, physical property possesses the maximum amount of physical endurance. For that reason its capacity to serve is then present in maximum degree. The capacity to serve, which investment established is gradually exhausted, due to certain ascertainable causes, while yet other causes operate from time to time to restore in whole or in part that capacity which has been consumed. The exhausting forces are in constant operation, with respect to one or the other of them, and with varying effectiveness. The effects of some of these destructive causes accrue gradually, and with fair uniformity, while the effects of others mature suddenly and with erratic results. On the other hand, the restorative agencies produce only sudden effects which in some cases are fairly uniform and reasonably continuous, while in other cases they are irregular and spasmodic in occurrence. A clear conception of the substance to be accounted for will enable us to perceive that whether we refer to it as "depreciation" accounting or by some other name, the procedure should nevertheless comprehend every factor which operates to destroy, and every factor which operates to restore, the capacity to serve which property possessed when the investment was made therein. If "depreciation" is construed so as to exclude certain causes which also operate spasmodically to consume the usefulness of property, and we believe it should be so construed, the accounting procedure to be prescribed should dispose of such exclusive causes as well as depreciation itself. The procedure should also, of course, make equally satisfactory provision to take account of the effects produced by agencies which rehabilitate and prolong the useful life of property. They are extraneous to, and the very antithesis of, depreciation. These different phases of the situation can be satisfactorily provided for by directing the accounting processes to the substance involved in the transactions which the accounts must record. It is respectfully submitted that, as a practical matter, it cannot be done otherwise.

Among the ponderable causes which exhaust service capacity, the following are generally recognized:

(a) *Lapse of time*, which occasions deterioration due to the action of the elements, and decrepitude due to advancing age;

(b) *Wear and tear of usage*, which is augmented by the lapse of time. These two factors may be considered together under the head of superannuation.

The effects of usage are invariably destructive of service capacity, save in the case of lands and grading. Use progresses with the lapse of time. Effects due strictly to wear and tear occasioned by use accelerate the damage attributable to age. The effects of age make property more vulnerable to wear and tear of usage. It is seemingly necessary, for that reason, to consider these factors together. Superannuation from an accounting standpoint affects exhaustible property in a destructive way only. The destruction proceeds gradually and is continuous. Exhaustion caused by age and use can be overcome by repairs, renewals, or replacements if the property is of the repairable kind, otherwise its progress cannot be retarded. The matured effects of superannuation have a *current* incidence, and thus become an element of the prime cost of concurrent operation.

(c) *Inadequacy*; which is inability to meet the present demands of service requirements. Inadequacy is not a present and continuing cause of exhaustion of service capacity. Its losses should not be anticipated for the purpose of including them in prime costs of performance in priority. If such losses are recognized as contingencies of the future, reservation to provide for them may be made from income, but not by charges to expense, because accounting as generally practiced is not anticipatory, and it should never be made anticipatory. Costs must deal only with facts of events transpired. The practice of taking to account the accrued proportion of unmatured charges and credits, on the basis of their actual incidence, and according to the rate of their actual accrual, is not "anticipatory accounting." It is merely an effort to record faithfully the experience of the past, and there is no warrant or reason for seeking to make so-called depreciation accounting do more than that. Anticipation and advance booking of future losses is as intolerable in good accounting as the anticipation and booking of expected but unearned profits. If losses due to retirements because of inadequacy are to be accounted for in advance of their realization, consistency would urge that resultant economies should also be forecast and accounted for in advance, because the principle would be the same in both cases.

Losses caused by inadequacy should be accounted for if, as and when they occur. For the purposes of depreciation accounting they should be treated as a part of the cost of supersession and spread over that period which enjoys the use of the property on account of which they were incurred.

(d) *Obsolescence* which arises from the fact that the property has ceased to be useful, for practical or for economical reasons. Obsolescence is not a presently operating cause of exhaustion of service capacity. Its action is precipitate. When, due to its advent, property is retired and a loss realized, the loss thereupon becomes an operating expense through supersession costs if operations continue. If operations are discontinued, the loss is chargeable against reservation of income or surplus made in anticipation of it; otherwise it is chargeable to profit and loss. In holding that losses occasioned by property becoming obsolescent are in no vent includable in service costs because of their contingent nature, we are not contending that the allowable rate of return should not provide income sufficient to cover such losses, nor do we say that

it should. Whether the public obligation includes restitution of capital invested in an enterprise which has suddenly ceased to be useful and needful, in addition to paying a fair return upon the value thereof during the term when it was useful and needful, is a legal question which has to do with other propositions than the technic of accounting. It is sufficient to say that operations of a prior period are not responsible for nor advantaged by retirement due to obsolescence. For the same reason that operations in priority should not be accredited with a portion of benefits potentially to ensue through substitution of obsolete property, they should not be charged with an accrual of expense incident to such benefits.

(e) Public demand, which may be occasioned by inadequacy, or obsolescence, or both, and losses with respect to which should be accounted for in the same way.

(f) Changes in the art, which give rise to inadequacy, or obsolescence, or both.

(g) Casualties, such as storms, floods, fires, wrecks, explosions, etc., are causes responsible for exhaustion of service capacity. Losses resulting from hazards which cannot be protected by insurance are incidental to and an inseparable part of the current cost of operation, and should be so accounted for. However, abnormal unprotected losses may be amortized over a subsequent period of reasonable length, simply as a matter of accounting expediency to avoid the disturbance which their current absorption might cause, but this practice, we think, should be confined to exceptional cases and should be made permissive rather than optional.

There is but one cause, on the other hand, which contributes to the replenishment of that service capacity which property possessed when it was new, and that is repair, renewal and partial replacement work. Difference in character and efficacy divide this work, however, into two classes, each of which has different significance, to wit: (h) Ordinary repairs, which are universally made from day to day in all cases where the property is susceptible to repair, and

(i) *General and classified repairs*, which are made periodically when ordinary repairs become impotent or uneconomical.

Repairs, renewals, and partial replacements are the media through which service capacity is restored once it has been consumed. The restorative effect of ordinary repairs works in constant opposition to the exhaustive effect of advancing age and daily use.

The universal practice is to make ordinary repairs to every kind of property which is repairable. In the case of certain classes of property which are not susceptible to repairs, exhaustion proceeds uninterrupted to the end. The extent to which individual instances of ordinary repair work may restore service capacity cannot as a practical matter be accounted for.

The limits of ordinary or routine repairs are fairly well established. The time comes when disrepair condition yields to ordinary treatment only when the repairs are made with such frequency as to entail an extravagant outlay for labor and materials, and frequent and extensive withdrawals from service usage. Deterioration which accrues gradually, and defects so deep-seated as not to be reached by routine repair processes, begin to manifest themselves as major faults, and they tend to compound rapidly. The routine maintenance procedure then becomes manifestly uneconomical and ineffectual to estop the rapid exhaustion of service capacity. Thereupon the property is either retired, or general rehabilitation is accomplished through "general" or "classified" repairs, as judgment as to the relative economies may dictate.

On every railroad the nature and extent of routine repair practice is fixed by executive orders, or by local habits. Like every routine function, it adheres to a well-



defined standard of effectiveness. The standard may vary on different railroads and on different parts of the same railroad. However, because there is a standard of ordinary maintenance the level of which is established either by habit or by predetermination, the original physical endurance of repairable property is augmented by it. Since there is no way of disassociating the effectiveness of routine repairs from the effectiveness of physical endurance built into the property when it was new, the two things must be considered together in reckoning that basic service capacity which may be influenced by other erratic and contending causes which operate to exhaust or restore it.

General or classified repairs begin where routine repairs leave off. They accomplish in a wholesale way what routine repairs accomplish in a piece-meal way. In an individual case of ordinary repairs, the necessity for the expenditure is obvious and its justification apparent because the needs of today, rather than those of tomorrow, are the issue, and there is no alternative available. In the case of wholesale repairs, however, the considerations are different. The ability to meet momentary requirements by piece-meal repair work is recognized, but the economy of that procedure is questioned. The most economical way of providing service capacity for the benefit of tomorrow is at issue. There-

fore, in the case of wholesale repairs, unlike the instance of ordinary repairs, the *quantity* of service capacity gained must be measured, because it is the essence of the transaction. When wholesale repairs are made, therefore, we are justified in assuming that it was affirmatively decided that, all things considered, the unit cost of the service capacity thus provided was less than if it had been provided through either of the alternatives—

(a) Continuation of the routine of ordinary repairs, or

(b) Retirement of the unit and its replacement with a new one.

Repairs of this class rehabilitate property in substantial measure, building back into it service capacity which use and age exhausted and which ordinary repairs failed to restore.

The prime requirements in the immediate particular, therefore, is that general and classified repair work shall be evaluated, not only as to its cost in dollars and cents as heretofore, but also in units of service capacity.

[Mr. Roberts summarized the foregoing in a chart which was offered as an exhibit. The chart and the description of his "alternative plan" designed to carry out the principles outlined will be presented in a later issue.—EDITOR.]

## Disastrous Floods in New England

*Three days of heavy rain—130 lives lost—Main railroads blocked for many days*

**M**OST of the state of Vermont, the whole of the valleys of the Connecticut and Merrimac rivers and extensive areas in New Hampshire, Massachusetts, Connecticut and New York were visited on Thursday, Friday and Saturday, November 3, 4 and 5, with the most extensive and costly storm (of rain) in the history of the region, both railroads and highways being destroyed for uncounted miles. Restoration of these roads even temporarily will require weeks of work, and the property losses will aggregate many millions. Montpelier, capital of Vermont, a town of 8,000 inhabitants, had, for about 40 hours, no communication of any kind with the rest of the world, having no facilities even for radio or airplane. The small village of Becket, Mass., on the Boston & Albany, 36 miles west of Springfield, was nearly destroyed by the failure of a dam on a very small stream. The line of the Boston & Albany for 3½ miles east of Becket is practically destroyed (except that some of the bridges are still standing), and will not be restored under two weeks.

There was no very remarkable loss of life at any one place but the aggregate number of deaths in the five states is 130 or more.

### Boston & Maine

The Boston & Maine suffered in all of the above named states except Connecticut. Parts of the lines were put out of service on November 3; first in the Connecticut River valley between White River Junction, Vt., and Wells River, and for some distance south of Bellows Falls. Next came overwhelming floods in the Hoosac Valley in northwestern Massachusetts, southern Vermont and eastern New York. A day later, innumerable washouts developed in northern New Hampshire, both on the Connecticut River side and the Merrimac side of the mountains. By Sunday night there were on these

New Hampshire lines 100 major washouts. Forces for reconstruction work were quickly organized and 4,500 men are now at work. Officers of the company speak with enthusiasm of the loyalty of employees, all classes volunteering. Shopmen, car inspectors and others tackled all sorts of problems. Two employees met death in the swirling waters. Work was continued night and day. The main line from Boston to the Hudson River was made passable within one day except that motor coaches had to be used to carry passengers between Williamstown, Mass., and Eagle Bridge, N. Y., 21 miles. Passengers between Boston and Montreal were carried over the Fitchburg division and the Delaware & Hudson.

By Tuesday of this week, the track between Boston and the Hudson River was restored and the Boston & Albany made use of the Boston & Maine for perishable freight between North Adams, Mass., and Ayer. On Tuesday the Boston & Maine was in operation from Boston to Bellows Falls, Vt.; Boston to Claremont Junction, N. H., and Windsor, Vt.; Boston to North Conway, N. H.; Boston to Plymouth, N. H., and from Springfield, Mass., to Brattleboro, Vt. Montreal passengers were sent from Boston via Portland, Me., and over the Maine Central to Somerset Junction and the Canadian Pacific. The principal lines still to be restored are those from Windsor, Vt., to Wells River, Vt., and from Plymouth, N. H., to Wells River. Boston & Maine lines in Maine, eastern New Hampshire, eastern Massachusetts and the central Massachusetts division were not seriously damaged. A principal problem of the Boston & Maine was to move perishable freight, the city of Boston depending for its supply of milk on scores or hundreds of towns on Boston & Maine lines. Boston dealers procured large supplies of milk from New York city, Philadelphia and Washington, D. C.

By Tuesday noon, November 8, with restoration of

the tracks in the Hoosac Valley, freight trains from the west were moved to Boston and New England in large volume. The Boston & Albany used the B. & M. for urgent freight and the B. & A. single-track branch of 20 miles from Pittsfield to North Adams moved 800 cars of freight within about 24 hours. The B. & M. sent milk over the B. & A. from East Albany to North Adams.

#### Maine Central

Flood conditions on the Maine Central reached height on Friday and Saturday. On the Rangeley branch north of Canton, operations were stopped for 63 miles on account of high water in the Androscoggin River and tributaries, with many washouts and landslides. The line into Rumford was opened on Sunday noon, and into Kennebago Tuesday afternoon.

On the Mountain division the lines west of North Conway, N. H., as far as Beecher Falls, Vermont, 95 miles, and from Quebec Junction, N. H., to St. Johnsbury, Vt., 32 miles, were closed by high water. The line between Portland and Bartlett was opened on Sunday night. There were heavy landslides and deep washouts in the roadbed near Sawyers River, N. H., Willey House and at several points between Crawfords and Fabyans. Near the Frankenstein, N. H., trestle, a landslide fell upon a long freight train and wrecked some of the cars in the middle of the train.

On the line between Quebec Junction and St. Johnsbury, there were many washouts and the 150-ft. bridge over the Passumpsic River in St. Johnsbury yard was lost. This bridge, a bow string lattice, was burned by the St. Johnsbury city authorities when it was apparent the bridge would soon be carried out by reason of washing out of one of its abutments. The action of the city authorities undoubtedly saved the highway bridge nearby. The line was opened between Willey House, N. H., and Beecher Falls, Vt., on Monday, and between Bartlett and Willey House on Tuesday night, thereby completing an open route under temporary repairs between Portland, Me., and Beecher Falls, Vt.

The line between Quebec Junction and the bank of the Passumpsic River in St. Johnsbury was opened on the 9th. It is expected that a temporary bridge will be completed across the Passumpsic River by November 16. The flood damage to Maine Central and connecting railroads temporarily affects interchange of approximately 125 cars a day.

#### The Central Vermont

The line of the Central Vermont from Montpelier Junction, southward to White River Junction, 62 miles, was in what was perhaps the worst flooded region in the state. Twenty or more bridges in this section were destroyed or made impassable. Northward from Montpelier Junction to Essex Junction, near Burlington, the condition is doubtless equally bad, but we have no details. On Tuesday of this week this road was reported in operation from St. Albans southward to Essex Junction, 24 miles, but "utterly impassable" thence south to White River Junction.

Montpelier is on a branch of the Central Vermont, 1½ miles from the main line. Press dispatches from there on Sunday evening predicted that there would be no regular train service out of the city for several months.

On Wednesday of this week, news gatherers at Montpelier, reviewing the situation on the Central Vermont, expressed the belief that the road was "a hopeless wreck" and that many miles would be impassable "for months."

#### Rutland Railroad

The Rutland Railroad suffered at many places throughout the length of its lines in Vermont and for long stretches south of Middlebury was badly damaged.

Between Middlebury and Rutland there are six big washouts where restoration of the line will require from three to four weeks, but traffic will be moved over detours. South of Rutland, there are numerous washouts and one important bridge failure, but this part of the line probably will be made passable this week.

North of Burlington, the iron bridge over the Winoski River, three spans of 150 ft. each, was practically destroyed.

Between Rutland and Bellows Falls, 52 miles, there were eight or ten major washouts and 50 smaller ones, and one bridge was weakened. It is hoped to make this line passable by November 14.

#### Delaware & Hudson

The main line of this road, from Albany, N. Y., northward to Montreal, on the west side of Lake Champlain, was not seriously damaged and it is over this line that the through passenger business to and from Montreal, which normally moves over the Central Vermont and the Rutland, is now being taken. Two branches of this company in Vermont were, however, under water for long stretches, for a short time. Here there were 20 or more washouts of considerable size, but traffic was restored within three or four days, except at one point. This was at Center Rutland (two miles from the terminus of the branch at Rutland), where a bridge 450 ft. long and 100 ft. above the stream was carried away. This disaster temporarily makes the terminus of this branch at Center Rutland and buses are used to carry passengers to and from Rutland.

#### New York, New Haven & Hartford

This road had to cope with numerous washouts on Friday, November 4; and two days later, when the waters from the mountains had reached Connecticut, the tracks of the Hartford division were flooded for a short distance, but not sufficiently to entirely stop traffic; one main track was kept in operation.

The washouts on Friday were mostly on minor lines and the tracks were either restored in short time or passengers were accommodated by the use of motor coach service, of which the New Haven maintains numerous lines in Connecticut.

The movement of Boston & Albany trains to and from Albany via New York city, turned a large number of trains over to the New Haven lines; eight passenger trains and five or more freight trains daily in each direction between either Springfield or Worcester and Mott Haven (New York city). The distance from Springfield to Mott Haven is 131 miles. The New Haven also moved 600 or more cars, daily, of freight normally belonging to other routes.

The Connecticut River at Hartford on Sunday was 28.71 ft. above mean high water, the highest in 47 years.

#### Canadian Pacific

The Canadian Pacific was damaged by washouts at many places between Newport, Vt., and Wells River. It was believed that more than a week would be required to make this line passable.

#### Boston & Albany

The double track main line of the Boston & Albany from Becket, Mass., 134 miles west of Boston, eastward, eight miles, to Chester, was ravaged by an unprecedented flood and for 3½ miles the roadbed was almost wholly washed away. In this distance of eight miles, there are 20 bridges crossing the Westfield River, and three of these bridges were carried away; a truss 109 ft. long, another of 65 ft. and a high stone arch of 45-ft. span. There are, in this section, also 50 culverts. This section of the line is a succession of sharp curves between high



ledges, and access to the railroad line from adjacent highways is for much of the way difficult or impossible so that the work of restoration has to be carried on from the east end and the west end, little or no material being obtainable over the highways. It is expected that two or three weeks will be required to restore this eight-mile section.

This line, besides being the route of a large volume of freight from the west to Boston and eastern Massachusetts, is an important passenger line, there being ten through express trains each way daily. This passenger movement is being mostly continued by a detour from Springfield to Albany, by way of New Haven, Conn., Mott Haven Junction (New York city), and the main line of the New York Central thence to Albany; 268

miles' travel to span 100 miles. The branch of the Boston & Albany from Pittsfield, Mass., to North Adams, was damaged by the flood but was soon restored. On Sunday, November 6, when the Connecticut River was still at its highest flood stage, the extensive shops of the Boston & Albany at West Springfield, Mass., were put out of service for several days by water 22 inches deep on the main floors.

A force of 40 carpenters was sent to Becket on Saturday to build a camp for the men who will have to be employed in rebuilding the roadbed. Seven bridge gangs, three of them from the New York Central, were assembled at Becket; and the Walsh-Kahl Company, a contracting firm of Boston, was engaged to rebuild the roadbed.

## I. C. C. Bureau of Safety Reports on Transverse Fissures

*Chides roads for failure to make greater progress in controlling this hazard*

**I**N a report dated June 16, but issued in October, the Bureau of Safety of the Interstate Commerce Commission has reviewed the derailment of a passenger train on the St. Louis-San Francisco near Victoria, Miss., on October 27, 1925, which resulted in the death of 21 and the injury of 130 persons. This wreck, which was caused by a broken rail containing several transverse fissures, was the most serious one due to this cause that has occurred since this form of defect first aroused attention following an accident on the Lehigh Valley at Manchester, N. Y., on August 25, 1911. The report consists in large measure of an extended discussion of this form of rail failure by James E. Howard, engineer physicist of the Bureau of Safety, in which he absolves the rail manufacturers from responsibility and attributes the defect to excessive wheel pressures.

The train involved in the accident consisted of five baggage and day coaches and seven sleeping cars and was traveling between 40 and 50 miles per hour at the time of derailment. The rail which failed was of 90-lb. A.S.C.E. section and was rolled of open-hearth steel at the plant of the Tennessee Coal, Iron & Railroad Co. in 1918. The initial fracture was 13 ft. 8¾ in. from the receiving end of the rail, from which point to the leaving end the rail was broken into not less than nine pieces, four additional partly developed transverse fissures being displayed by these fragments and two more transverse fissures being developed later by hammer tests, making seven in all in this rail. At the first break in the rail there was a transverse fissure which measured 1 13/16 in. by 1 7/16 in., and which extended to within 1/32 in. of the surface of the rail. The surfaces of the fissure were darkened, indicating that the air had reached it prior to the accident.

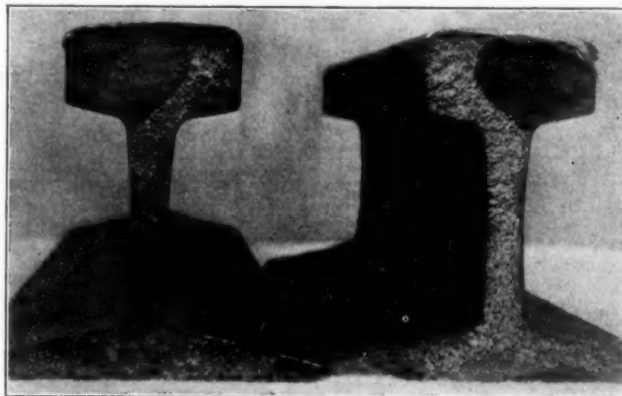
The following comments are abstracted from Mr. Howard's report:

The examination of the rail responsible for the present accident and other rails from the section of destroyed track displayed no feature uncommon in the tests of other rails. Two rails of the same heat displayed transverse fissures. Others rolled the same month and year and having practically the same chemical composition neither showed transverse fissures in the track nor in the tests subsequently made in quest of them. No

reason has been established why fissures were displayed in some parts of these rails and not in other parts; nor why the rails on one side of the track should display transverse fissures while those on the opposite side were exempt from their formation.

### Where Fissures Occur

A report of the commission in 1923 on the prevalence of transverse fissures on 17 railroads showed the location by mile posts of over 8,000 fissured rails. The number of known transverse



Appearance of the Opposite Faces of the Transverse Fissure  
First to Break—Heaving and Receiving Ends,  
Respectively, of Fragments A and B.

fissures at the present time exceeds 22,000, representing several thousand heats of steel.

Transverse fissures appear in rails of different chemical composition, with the tendency greatest in the hardest steels. High-carbon steels have displayed them in large numbers. They appeared in chrome-nickel steel rails prior to the Manchester accident. They are found in rails from all parts of the ingot. On some roads they predominate in rails from the upper part of the ingot; on other railroads chiefly from the upper and lower parts. Again, they have appeared in the D rails in greatest numbers up to the age of four years, after which the B rails equalled in numbers the D rails.

They are found in rails of different weights per yard. They have not been reported in very light weight rails, undoubtedly due to mild track conditions. The heaviest rails now in use, up to 136 lb. weight per yard, are not immune from their formation. The display of transverse fissures is not confined to any one

section of the country. They are most prevalent, however, in territory where traffic is heaviest. The influence of density of traffic is clearly shown on double track road. Rails which carry the greatest tonnage display the most fissures. Low rails of curves commonly display more transverse fissures than high rails. In regard to the rails themselves, fissures predominate on the gage side of the head. There is reason for believing that speeds of trains have an influence, high speeds accelerating their development.

The time required for their display varies from a few months to a term of years. The interval of time in the track from 5 to 15 years embraces the majority of the fractures. The extreme range is from a few months to 30 years. Bessemer rails chance to be among the oldest. Hard steels, density of traffic, and wheel loads are factors the influences of which are paramount in the development of transverse fissures.

The weight of the rail, or specifically the size of its head, within limits, does not exert a substantial influence in the relations of the internal strains set up therein. The volume of metal disturbed by the wheel loads is regarded a vital factor in relation to the development of transverse fissures. As the matter stands the intensity of the impressing pressures between the tread of the wheel and the running surface of the rail and the volume of metal disturbed, the latter depending upon the magnitude of the wheel loads, constitute the factors which introduce internal strains that cause or tend to cause the formation of transverse fissures.

A zone of metal at the top of the head acquires a state of internal compression from the impinging pressures of the treads of the wheels on the running surface of the rail. These internal strains of compression are counteracted and balanced by strains of tension set up in the interior of the head. Transverse fissures have their origins in this interior zone of metal. This explana-

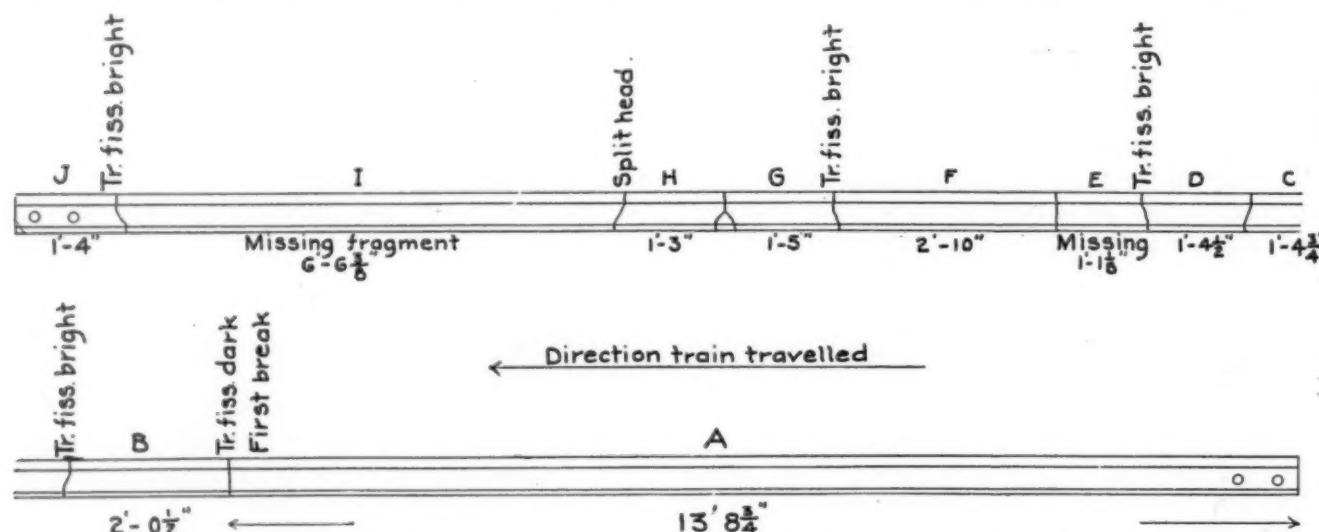
tion of the development and display of an interior fracture, based upon a law of physics that tensile fractures must occur in zones exposed to tensile strains, and can not occur in zones in a state of compression, was so self-evident and axiomatic that no extended remarks were offered in the original report on this type of fracture.

No mystery surrounds the formation of a transverse fissure, nor has there been one at any time. The explanation is simple. There is an exterior strain of compression, an interior strain of tension.

There is no real occasion to appear astonished or awe stricken over the thousands of rails which are displaying transverse fissures in the tracks. The development of interior fractures is entirely consistent with our knowledge of the strains which are set up in the interior of the heads of rails by action of wheel loads on their surfaces. The rails are obeying a physical law by which all members which sustain loads, carried upon wheels, are governed.

Shrinkage cracks are held by some as essential antecedent conditions for the inceptions of transverse fissures. In some cases they do furnish the locus; incipient fissures having been found originating in shattered zones. Other transverse fissures have been located unassociated with shrinkage cracks, and still others in rails where search has revealed no shattered metal whatsoever. This feature is deserving further observation and study. Shattered zones, similar to those of the head, are found in the metal at the junction of the web and the base. No example of a transverse fissure has been displayed in this part of the rail. Measured track stresses have shown higher tensile stresses in the base than those of the head, under beam action. Hence it follows that bending stresses do not appear controlling factors in the formation of transverse fissures.

The properties of carbon steel are such that bending stresses can not be held accountable for the display of transverse fissures, except in a secondary degree. As a beam the strength of the rail would rapidly diminish with the growth of a fissure. The growth of two transverse fissures in close proximity would be practically incompatible with beam action. When, however, a sufficient degree of weakness has taken place by reason of the extension of the transverse fissure the fracture of the balance of the rail suddenly occurs in the track, in the manner which it would fracture



Drawing of the Rail Which Caused the Accident, Showing Location of Fractures Made in the Track

tion of the development and display of an interior fracture, based upon a law of physics that tensile fractures must occur in zones exposed to tensile strains, and can not occur in zones in a state of compression, was so self-evident and axiomatic that no extended remarks were offered in the original report on this type of fracture.

No mystery surrounds the formation of a transverse fissure, nor has there been one at any time. The explanation is simple. There is an exterior strain of compression, an interior strain of tension.

#### What Conditions Produce Fissures

Another question is why one steel differs from another in its ability to resist track or other stresses. That question is now uppermost, and whether the margin in strength and endurance has not been reduced in some cases to a narrow margin, in others obliterated.

A perfectly legitimate question is raised in respect to endurance. By concurrence of opinion engineering practice has established standards of stresses to which important structural members may be exposed or not exceeded. It has not come to notice that any restrictions have been imposed, or even advocated, upon the loads which shall be concentrated on the head of a rail. However, this matter was referred to but not acted upon in an item of the American Railway Engineering Association in its program for 1924, which read: "The determination of the maxi-

um permissible wheel loads imposed by the passage of wheels of various diameters."

#### Fissures Have Been Produced Experimentally

Transverse fissures have been produced experimentally in new rails. Their positions in the head of the rail was under control. They were developed centrally when the rail was loaded in upright position, or located in the right or left side of the head when the rail was canted to the right or to the left.

Artificial transverse fissures were made by means of gagging blows applied successively at short intervals along the head, then reversing the rail and repeating the blows along the base. The tests were made on half-rail lengths. Referred to full-rail lengths, the number of blows required to break the rails and disclose the transverse fissures ranged from 50,000 to 250,000. Each gagging blow was more severe than used in the ordinary straightening of a rail. These tests showed there is little need of anxiety concerning the effect of a score or less of gagging blows in the usual straightening in the gagging press, as affecting the integrity of the metal. Gagging blows in ordinary practice are delivered only once or twice in a place, and seldom in reversed direction.

Artificial transverse fissures were of interior origin, identical with those developed in the track. They displayed surfaces re-



sembling the nuclei of track transverse fissures, without the silvery burnished effect believed to be caused by the opposite surfaces being hammered together and closing the minute gap between them when the wheels are directly above them. Different weights of rails and different heats of steel were represented in these artificial transverse fissures.

### Difficult to Discover

Transverse fissures in the tracks before final separation of the rails are discovered at times. Fine hair lines appear on the side of the head, commonly on the gage side, where vertical cracks separate the peripheral metal. Prior to complete separation a rust streak may appear, indicating the approach of a transverse fissure to the surface of the head. Careful scrutiny is necessary to detect these premonitory signs, which do not appear until complete fracture is close at hand. Some surface manifestation is, of course, necessary to admit of microscopic detection.

When thousands of rails each year display transverse fissures it is a matter of grave importance respecting safety of travel to acquire some definite information upon their presence in rails in the track in their early stages of development. Derailments due to transverse fissures are rare in which the initial break in the rail does not show a fissure having darkened surfaces; that is, a transverse fissure which had not broken through the peripheral surface of the head, admitting air and acquiring darkened surfaces. It follows that all such fractures were possible of detection before the derailment occurred. The possibility of detection, however, may have been limited to an interval of time of very brief duration, too short to be of practical value. There are physical limits to track inspection, and the detection of rails which are on the immediate verge of rupture yields a margin in safety too slender to commend itself.

It is customary on some railroads to remove from the track all rails of a heat in which a certain number have displayed transverse fissures. Under the rules established by one state such removal is mandatory when three rails have displayed transverse fissures. The promulgation of such a rule carries with it, by implication, the assumption that some inherent defects exist which permeate the entire heat. The physical condition of the rails thus removed, however, does not appear yet to have been the subject of inquiry. From the standpoint of economy it is not justifiable to remove thousands of rails upon unsupported suspicion. By implication, also, such rules place responsibility for the display of transverse fissures upon some indefinite, undefined property of an entire heat upon which no evidence has yet been discovered. Some inspecting engineers go a step farther and assume that individual ingots differ essentially in their tendencies to display transverse fissures. Vagueness prevails in the foundations of such beliefs, which attach to no-known physical property. The only definite feature is the assertion itself that some heats of steel display transverse fissures while others do not, or have not under identical conditions of service.

### Progress in Detection

The detection of the presence of transverse fissures in their early stages of development presents a tangible subject for discussion. Devices which have been offered are of two classes, those which depend upon variations in magnetic properties and those which depend upon differences in electrical resistance. No practical results appear to have been reached with magnetic devices and contingencies are such that none would seem to be expected.

The possibilities of an electrical resistance method were definitely shown in a demonstration made by Elmer A. Sperry in 1923 or the early part of 1924. Experiments were conducted upon a model in which an interior air gap had been prepared, representing in effect a transverse fissure. The location of the air gap was indicated by Mr. Sperry's device, who at that time expressed the conservative belief that an internal transverse fissure equal in area to 15 per cent of the head could be detected by his apparatus. Since no transverse fissure of that limited size has come to notice as the primary cause of a derailment it necessarily followed that the detection of such fissures in the track and those somewhat larger in size would be the means of averting accidents due to the development of this type of fracture.

The results of the demonstration made by Mr. Sperry in 1923 did not immediately attract favorable attention from the users of rails. However, after the lapse of some three years the matter was taken up officially by the users of rails and an appropriation made for the fabrication of an apparatus for the tests of full-sized rails.

Recent demonstrations with the Sperry detector have shown it capable of indicating the locations of transverse fissures in different stages of development from those in area less than 2 per cent the area of the head up to those which have separated the

major part of its cross section. Conversely, in certain rails each of which has displayed a transverse fissure in the track and have been shown by the detector to contain none other, the most diligent search for an additional fissure has been without avail. The detector differentiates the interior fissures according to their sizes.

### Mill Practice Not at Fault

Critical comments appear from time to time upon mill practice including both the making of the steel and the rolling of the rails. The trend of such comments has been to place the responsibility for the display of transverse fissures upon the steel manufacturers. The extreme vagueness and intangibility of the comments are obstacles to their investigation. Rails are made in shapes in strict conformity to templates. Specifications governing their chemical composition are met. The amount which a rail shall contract in cooling from the hot saw to atmospheric temperature is often prescribed. A limit is at times placed upon their straightness prior to gaging. Drop tests are made, and a final inspection for surface. These are features which rail makers are called upon to meet. If a relation is established between the chemical composition and primitive physical state of the rails and their endurance of track conditions such information must come from the users of the rails.

Investigations conducted by the bureau of safety have shown no inherent reason for attaching responsibility for the display of transverse fissures to manufacturing conditions, either in the making of the steel or in the rolling of the rails.

The rate of growth of a transverse fissure is a matter of extreme importance to acquire information upon, but obviously can not be told from surface inspection. It is desirable to ascertain what degree of severity in service conditions leads to the formation of this type of fracture. Transverse fissures prevail in some localities; they are unknown in others. In locations where they prevail the relation of definite service conditions to their display has been shown.

In respect to their avoidance or overcoming the formation of transverse fissures the outlook is not promising. In fact, no encouragement whatsoever is presented. Intense study has not yet detected any specific cause for their prevalence in one heat of rails over another of similar composition, nor why from a metallurgical point of view one rail should display a transverse fissure after a very brief interval of time in the track and another endure for a long period. It is logical to assume that phenomena of this kind depend upon something else than a consideration of the initial physical properties of the rails themselves. The factors to be given consideration are the strains and stresses to which the rails are exposed.

Two principal features are presented in the track-structure problem; one is to find the steel which has the greatest endurance to track stresses; the other is the detection of incipient fractures, whether they are transverse fissures or other types of fracture.

At present there is no remedy known for the prevention of transverse fissures, current track conditions being considered. It seems, however, that the matter of their detection has been solved, constituting the greatest accomplishment yet heralded.

### Suggestions for Improvement

A report of this kind would hardly be complete without appending some suggestions or recommendations intended to improve present conditions.

1. Steel rails would be improved against the display of certain common types of fracture by the elimination of both internal and external seaminess. Internal streaks or seaminess in the head and external seaminess at the lower surface of the base are two critical parts in the cross section of a rail. These two causes of rail fractures, internal and external seaminess, furnish problems for the steel mills to overcome or minimize.

2. The railroads occupy a favorable position to acquire data upon the longevity of rails in respect to the display of transverse fissures. Material is at hand for comparing the properties of rails which have displayed transverse fissures at widely differing ages. The problem is to ascertain whether any physical, structural, or chemical factor is responsible for the variable behavior of rails in the track or whether differences in longevity are due to undefined track stresses.

3. Research problems specifically referring to steel rails, or in fact to steels in general, are somewhat numerous. Can the presence of a strain, positive or negative, be recognized in any other manner than by permitting its release? By what means can exhaustion of the ability to permanently elongate be recognized without subjecting the steel to its limit of ultimate resistance? When changes in density occur, what are the interrelations of the microconstituents? These and kindred queries present themselves in studying the mutual relations, causes and effects, of wheel and rails.

# Comprehensive Plan Outlined for Railways Owning Ships

*Edward N. Hurley, formerly chairman of the Shipping Board, believes railways should engage in ocean transportation*

**F**OLLOWING the suggestions outlined in a previous interview, published in the *Railway Age* of September 17, Edward N. Hurley, war-time head of the U. S. Shipping Board, has submitted to the chairman and members of the present board a comprehensive plan for the creation of a powerful, privately-owned merchant marine, deemed absolutely essential for the dual need of equipping American business to meet the increasingly bitter struggle for world trade, and the strengthening of the national defense.

Among the ideas emphasized by Mr. Hurley are:

Recommendation that the railroads participate in the ownership and operation of ships.

Recommendation for a congressional appropriation of a revolving merchant marine fund of \$500,000,000, to be loaned at 2½ per cent to private interests for the building of freight and passenger ships.

Opposition to a government subsidy on the grounds that subsidies destroy initiative and breed inefficiency.

That American business must have at its disposal an American merchant marine to carry up to 50 per cent of our exports or suffer severely in the industrial war for which Europe is now girding herself.

Purchase of the war-built fleet of ships now in possession of the shipping board by private interests benefiting from the revolving merchant marine fund.

Enrollment of selected vessels in the U. S. Naval Reserve, such vessels to serve in time of need.

Showing the imperative need of the proposed merchant marine fund for development of our shipping industry, Mr. Hurley said:

"The cost of building ships in American yards is materially higher than that at which the same types of vessels can be built in foreign countries. American ship operators know that if they were to have ships built at the present American prices, for replacements, or to increase their fleet with fast freighters or passenger ships, they could not compete with lower-priced ships built in foreign yards, because the high fixed charge on capital invested would too greatly increase their cost of operation.

"In order to stimulate shipbuilding in America, some practical and effective steps must be taken by the government not only to offset the high costs in our yards, but also, at the same time, to make it possible that ownership and operation be controlled by private shipping companies or railroads, in co-operation with the United States Shipping Board."

"To meet the present situation," Mr. Hurley declared, "I propose that Congress should appropriate a revolving merchant marine fund of \$500,000,000 for the purpose of building modern American passenger and freight ships, with an interest rate of 2½ per cent per annum, the money to be loaned to shipping companies or railroads on a first mortgage, to build ships in American shipyards, with the understanding that for every modern ship built with money borrowed from the government, a given number of the present war-built fleet of ships,

now owned by the government, must be purchased by the borrower, and at the same terms now in force by the shipping board."

Discussing the reasons for his belief that railroads should engage in the shipping business when such participation is found to be beneficial to the carriers and the national interest, Mr. Hurley said in part:

"The railroads of our country are vitally interested in foreign trade, as by its increase or decrease their tonnage and earnings are directly affected. Ninety per cent of all passenger and freight business for overseas emanates from the interior and is carried to our ports by railroads. I am, therefore, hopeful that, with the plan outlined, there will be an inducement for the railroads to become interested in overseas shipping. They could become so interested, either directly by building and operating ships, or indirectly through stock ownership in American shipping companies that are now carrying our foreign commerce.

"There is no law prohibiting any railroad from owning or operating ships, or from holding stock in shipping companies engaged in overseas business. Section 11, of the Panama Canal Act, which prohibits railroads from owning and operating ships in intercoastal trade, should be repealed. If the railroads become engaged in world shipping they should be allowed to participate in intercoastal traffic."

## Why Railroads Should Engage in World Shipping

"Freight rates on all ships engaged in the intercoastal business should be under the direction and control of the Interstate Commerce Commission. The mid-west manufacturer feels that he is being discriminated against by his government in being required to pay an excessive toll on his railroad freight to the Pacific Coast, as against his Atlantic Coast competitor who ships goods by water through the Panama Canal at very low rates. The mid-west manufacturer has paid his share of the cost of building the canal, and should not be penalized.

"Some equitable adjustment of rates should be made by the Interstate Commerce Commission that would be fair to the mid-west manufacturers, the people on the Pacific Coast, and the railroads and ship owners. Furthermore, the shipping board should not sell low-priced ships for intercoastal business, thus enabling purchasers to cut freight rates and further demoralize the coastwise business—thereby creating unfair competitive transportation conditions through a government-owned canal.

"The railways are operating with striking efficiency and they owe it to the public of America, to themselves and their stockholders to extend this efficiency to ocean shipping. The vicissitudes of a hundred years of herculean struggles have built for them organizations capable of applying to shipping the efficiency which is needed and can be had by co-operating with the leaders of shipping companies now engaged in operating passenger and freight ships.

"Congress and public opinion no longer frown upon



amalgamations of railroads, as they did for 30 years. Railroads some years ago were forced to buy up competing water transportation routes on lakes and rivers. Those water lines in northern states, to be sure, could operate only in summer, but that was enough to cripple railroad service by their competition and left the land lines to stagger under over-loads through the winter months. This practice grew and the consequent abuses became offensive. The result was federal control through the Interstate Commerce Commission and attendant legislation. Out of this grew co-ordination of rail and water transportation rates, with great advantages to the shippers by reason of through bills of lading, with apportionment of rate to each carrier, whether by land or water.

"The opening of the Panama Canal has brought about serious competition in transcontinental business for the railroads. The appropriation of public moneys for the building of that water-way carried with it legislation calculated to guarantee this means of competitive ship and railroad operations, since railroads may not own coastwise tonnage.

"Although the railroads are thus made keenly aware of the cheapness of water carriage as compared with land transportation, it is doubtful whether any railroad authority has ever made a real study of the relative costs. A freight vessel of 10,000 tons burden transports the equivalent of ten full size train loads. It operates without the cost of franchise, capital charges for roadbed, right of way, signal, or heavy taxes paid to states.

"A scientific study of the strategic value of steamship connections to the Southern Pacific might reveal some factors of the greatest importance to the officials and directors of our eastern and other trunk lines. But even more illuminating would be a study of the great trunk line operated by the Canadian Pacific. No railroad in America has made greater progress in a given period of its existence, and this in spite of the fact that this line traverses thousands of miles of almost uninhabited territory and but little developed land. Its vast fleets of great steamships, plying on both the Pacific and the Atlantic, have been no inconsiderable factor in this success. Its experience points an object lesson to other American railways.

"Let us now consider some of the elements with respect to which the railroad as a steamship owner and operator may favorably affect the cost factor in ocean transportation. First of all, in the matter of freight solicitation: The Luckenbach Steamship Company has made the statement that 22 per cent of its gross revenue is directly chargeable to the expense of solicitation. This ratio is verified by other steamship companies. Every railroad maintains solicitation agents in every city, town and hamlet in its territory and the same facilities would serve to procure freight for steamship lines as well. The large trunk lines also maintain expensive offices in foreign countries, which offices might be similarly utilized without additional expense. As a matter of fact, these soliciting facilities already are engaged in helping steamship lines engage freight, in order that such freight may be routed by each line into its own terminals.

"Fuel takes over 30 per cent of a steamer's gross revenue. Here also the railroads serving the territory where coal is produced would find an added revenue in their direct control of ocean carriers. Terminal facilities are maintained already by the trunk lines in every seaport which they enter; and in most cases these expensive terminal facilities are extended without charge to any steamship line which loads cargo moving over the railroad concerned, or which discharges there.

"In a great many of our large ports, notably in New York, through which moves by far the largest volume of

our foreign trade in manufactured goods, there is duplication of port facilities to an enormous extent. Both the steamship and railroad companies maintain expensive wharves and docks and both are served by harbor lighterage facilities valued at millions of dollars and adding frequently as much as one dollar per ton to the cost of moving freight from one terminal to another. Much, if not all, of this duplication and excess expense could be eliminated by railroad ownership of steamship lines operating in foreign trade.

"Absolute control of the cargo to its ultimate destination would enable the railroad in such ports as New York to eliminate a great deal of harbor expense such as lighterage and towage. It would furthermore enable the road to avoid much dead time on cars, one of the most annoying expense items to every road. The co-ordination between rail and water carriage which would result from railroad ownership of strategic steamship lines would result not only in enormous savings to the railroads, but would serve to reduce the cumulative expense which shippers or consignees must eventually absorb.

"The railroads have had a very expensive object lesson in the comparative cost of ocean transport as against rail carriage. Until quite recently rail carriers found that freight from points as far west as St. Paul, destined for the Pacific Coast, was routed to the Atlantic seaboard for transshipment via intercoastal steamship lines through the Panama Canal. Obviously, shippers and consignees did not reconcile themselves to the extra long period of transit without having a compensating advantage in greatly reduced freight costs. In other words, intercoastal steamship lines could, in effect, absorb the cost of a rail haul one-third to one-half as great as that on direct rail delivery, then make a water haul four times as long as the direct rail haul, and could still underquote the railroads on their direct haul.

"The chief factor contributing to this cheap transportation to the Pacific Coast was the Panama Canal. Another factor was the building of our great war-time fleet, some 1,500 freight steamers having been built by the government, a very large number of which have since passed into private hands. These steamers were sold at prices in some cases far less than the cost of a new locomotive. Many others are still available to private purchasers at similarly low prices, and a little foresight on the part of railroads will lead to an appreciation of the unique opportunity which awaits them.

"There are certain systems that enjoy a preferential position with regard to freight movements of goods entering into foreign commerce, by reason of highly lucrative territory which they cover. These railroads could, with great profit to themselves and to the country, participate in the ownership of ocean tonnage. They could not only reduce costs, as above pointed out, but they could readjust their rate structures to meet the needs of exporters in certain highly competitive fields. Transportation could be made, as it were, an exportable commodity and be sold on a large scale and on a sound, economic basis.

"The first American railroads in this country to give this subject the scientific inquiry and study which it deserves will grasp the opportunity to make itself the premier rail system of the nation. Such a railroad will find, on examination, that construction costs in American shipyards are today from 25 to 35 per cent greater than costs in foreign yards. They will find also that the government is not unwilling to sell good ocean freight bottoms at a cost of about six to eight dollars per dead-weight ton, tonnage which would cost from six to eight times more if purchased in foreign or American yards. The railroad would thus have an initial capital cost well below its foreign competitors, being placed in a posi-

tion of receiving an inducement in the form of low interest on capital charges.

Several railroad mergers already have been consummated, and plans for even greater amalgamations are now awaiting action by the Interstate Commerce Commission. Were one of these mergers to contemplate including in their unified ownership and control a substantial steamship operation for European service, there can be no doubt that it would prove of great interest to Congress, the Interstate Commerce Commission and the public. It is equally probable that the Panama Canal Act, prohibiting the operation of railroad-owned tonnage through that waterway, would be repealed if it could be shown that the interests of the shippers and the public in general would be safeguarded, as they most assuredly can be. It is not less likely that the disruption of the Intercoastal Steamship Conference, an event which is threatened momentarily, will eventually develop into a grave menace to the general freight rate structure of the trunk lines of the country. If that occurred, it would set the roads back where they were 20 years ago and tend to undo a great deal of the enlightened legislative provision already made for sound transportation facilities and avoidance of friction with the public.

"Railroad administrators surely must be aware of the delicate nature of their present status and must realize that even a slight disturbance of that adjustment would be likely to cause the loss of almost all the ground that has been gained. A well-conceived project designed to bring about greater co-ordination of rail and water transportation facilities would be a most useful factor in serving to strengthen and conserve the position in which railroads are placed.

"Highly developed port and terminal facilities are made to serve jointly the railroads and steamship lines in all of the greatest ports of England and the Continent. Railroads in England control channel tonnage in trade with Ireland, Holland, France and Belgium. The Swedish State Railways and the Danish State Railways control deep-water tonnage trading in the Baltic, all with advantage to the public and to themselves.

"The past 15 years have witnessed a notable change in the manner of handling some of our basic commodities in foreign trade. The great industrial companies in America controlling oil, steel, sulphur, lumber, coal, nitrate, motors, fruit, sugar, etc., have acquired ocean shipping facilities operating in foreign trade as well as coastwise and intercoastal trade. These industrial companies sell water transportation on a wholesale basis, applying the same principle as is now so successfully used for mass production in manufacturing. However, this places the smaller manufacturers of such commodities as cannot be so standardized or are not manufactured on a vast scale, at a disadvantage with respect to deliveries in foreign markets.

"This situation affords a strategic opportunity for the railroads to come to the relief of these small shippers and others who control no shipping of their own. By so doing they not only would materially advance their own interests, but they would render an important public service. If vast aggregations of capital centered in a single industrial enterprise may legitimately increase its control over foreign markets by engaging in the steamship business, why may not a railroad offer equal advantages to the thousands of smaller shippers on its line whose existence and prosperity are largely involved with the fortunes of the railroads?

"American railroads may legitimately and with material advantage to themselves and to the nation at large engage in the ocean steamship business; for the following reasons:

"American public policy no longer is inimical to a reasonable expansion of railroad activities beyond the immediate sphere of their present operations.

"Congress is correctly interpreting the temper of the American people with respect to amalgamations, toward a fair return on capital invested in railway enterprise, and any soundly conceived plan to make even more secure the prosperity of the railroads, while at the same time securing a more economic and efficient system of co-ordinating rail with water transportation.

"Railroad management and experience in efficient organization can bring to the steamship business in America a cost-reducing factor which is foreign to anything now known in American steamship experience.

"Any one of the great trunk lines, with vast terminal facilities in New York and other seaboard cities, can utilize such facilities through its own steamship operations with attendant savings to shippers and with profit to itself. By availing itself of the opportunity to purchase Government tonnage at prices so low as to be almost nominal, a railroad may very materially appreciate its capital structure and increase its earning power, with comparatively slight capital interest charges.

"By reason of the present political exigencies which demand the upbuilding of an American Merchant Marine and the maintenance of ship lines in foreign trade, a railroad engaging in such enterprise may fortify itself by gaining the support of Congress, of the executive branch of the federal government (and especially of the public and the Interstate Commerce Commission) not only with respect to such enterprise but in the matter of rail consolidation which may be linked up with the mergers. Finally, in view of the opening up of a new era with respect to foreign commerce expansion wherein the United States is certain to make phenomenal strides in obtaining markets abroad for manufactures already being produced in very great excess of our own domestic demand, railroads are afforded a unique opportunity to gain the prestige and increased power which is certain to follow their more active and direct participation in international trade movements."

## Railroads Complete Evidence In Firemen's Wage Hearing

**P**RESENTATION of evidence by the carriers in the hearing at Chicago on the application of western firemen for a wage increase was completed on November 4 with the testimony of William J. Hagenah of Chicago, a statistician and economist, and of L. C. Fritch, vice-president of the Chicago, Rock Island & Pacific, and the cross-examination of J. L. Jacobs, an economist, who testified earlier in the week.

Donald R. Richberg, attorney for the Brotherhood of Locomotive Firemen and Enginemen, on November 3, challenged the accuracy of the basic figures used in computing the average annual earnings of firemen, hostlers and hostler helpers in the United States as presented in connection with the testimony of Mr. Jacobs. Mr. Richberg objected to their inclusion as a part of the evidence, charging that the average number of men reported by the railroads to the Interstate Commerce Commission through the "middle of the month" count does not comply with the accounting rules of that body. "It is made by the mere arbitrary determination of the carriers as to how many men they shall report," he said. When asked by K. F. Burgess, attorney for the carriers, if evidence showing the inaccuracy of reports of the num-



ber of men employed as reported to the Interstate Commerce Commission would be presented by the brotherhoods, Mr. Richberg stated: "I simply offer your own pay-rolls, in evidence here. They show it."

Figures presented by the railroads on November 1 showed that 30,090 firemen, hostlers and hostler helpers are involved in this arbitration based on the "middle of the month" count. Mr. Richberg claimed that the number of men employed is far in excess of 40,000. "We object to any effort to make an exact comparison and say that firemen earn more money in the West than in the East, because the entire result may depend upon the fact that they do more work," stated Mr. Richberg. Mr. Jacobs pointed out that the method of computing average earnings, though it might be an approximation, would provide a comparison between employees in the two districts. The inclusion in the number of employees of all names that appear on the pay-roll, whether a fireman worked one day or a few days in a year, will not produce a result which is in any way typical of the average earnings of firemen, Mr. Jacobs said. The objection of counsel for the employees was overruled.

Mr. Hagenah laid before the arbitration board the results of a study of the present economic conditions obtaining throughout the United States, with particular reference to conditions in the western states. No exhibits were offered although the study consisted of an analysis of public reports and of statistical research bodies.

"While the United States as a whole has enjoyed unusual prosperity during the last several years, this condition has not obtained uniformly throughout the country," asserted Mr. Hagenah. "The industries devoted to the production of iron and steel, automobiles, electrical machinery, luxury products, and most public utilities have broken all records for profits while the industries devoted to agriculture, petroleum, bituminous coal, copper and lumber have largely been unprofitable. Prosperity in the last four years has been genuine and extensive in the eastern territory, less marked in the South and still less favorable throughout the West. It so happens that those industries which have been outstanding in their production and profits are located almost entirely in the eastern group.

"The stimulation of agriculture by war conditions brought into play a large amount of land of marginal or sub-marginal production, creating a surplus and depressing the value of farm lands. From 1926 to 1927 the current value of all capital invested in agriculture, due to this deflation, declined from \$79,000,000 to \$58,000,000. During the last 10 years there have been 3,515 bank failures in the United States of which 2,030 occurred since 1924. Of these failures since 1917, 78.9 per cent have been in western territory while since 1920, 14 per cent of the total active banks in the West, 2 per cent in the East and 10 per cent in the South have failed.

W. M. Jeffers, general manager of the Union Pacific, was recalled to the witness stand to testify that the average age of a fireman upon entering service is 24 years and that the average age at the time of promotion to the position of engineman is 30 years. He also introduced an exhibit showing the time occupied by the fireman in physical labor, the results of 599 stop-watch tests made on all lines parties to the arbitration. These runs averaged 5 hours and 15 minutes on duty of which 1 hour and 37 minutes consisted of physical labor. Locomotives on which the tests were performed had an average weight on drivers of 148,625 lb. with an average coal consumption of 5.4 tons. On 195 trips on oil burning engines in freight service the average time on duty was 8 hours and 27 minutes, including 1 hour and 13 minutes of physical labor. These locomotives had an average weight on drivers of 227,643 lb. Three hundred and forty-three observations were made on stoker fired

freight locomotives where the firemen who were on duty an average of 8 hours and 36 minutes devoted 1 hour and 37 minutes to physical labor. The average coal consumption on these runs was 13.4 tons on locomotives having an average weight on drivers of 255,958 lb. In hand fired freight service 381 observations showed that with an average time on duty of 8 hours and 39 minutes only 2 hours and 32 minutes was devoted to physical labor. These locomotives had an average weight on drivers of 206,138 lb. and consumed an average of 8.6 tons of coal. Counsel for the Brotherhood on November 4 began the introduction of rebuttal with Frank J. Warne, economist and statistician of Washington, D. C., as the first witness. He presented a number of exhibits including one showing the improvement in the operating ratio of individual Class I railroads in the West from 1921 to 1926. In 1921, he stated, their operating ratio was 79.80 and in 1926, 72.47, reflecting the improved condition of the operating accounts as between revenue and expense. In 1926 in the eastern district the operating ratio was 74.77 and in the southern district 71.22, Mr. Warne pointed out.

Mr. Warne also spent some time explaining to the board the difference in railroad terminology between "capacity in use" and "potential capacity" and the effect of "generous" expenditures for maintenance in increasing potential capacity. Through rehabilitation of equipment and improvement of right of way the potential capacity of these roads has been increased to a greater extent than the capacity in use, he declared. Little weight should be given to the alleged low net return on investment for the reason that in a period of rapid reconstruction operating expenses are increased and net operating income is decreased, the witness said. He asserted that when investment increases faster than traffic the net operating income is reduced but when in the future the traffic increases faster than investment, the net will be affected in the opposite direction.

On November 7 Mr. Warne presented an exhibit in which he showed the difference, for each railroad involved in the arbitration, between the property for which the carriers had a reported total investment of \$8,435,000,000 on the valuation dates and the figure reached by the Interstate Commerce Commission through its tentative valuations, the final value, of \$6,527,000,000. The Brotherhood also called to the witness stand O. David Zimring, statistician and economist connected with the Labor Bureau, Inc., Chicago, who presented rebuttal evidence on exhibits introduced into the testimony by J. L. Jacobs during the previous week.

David B. Robertson, president of the Brotherhood of Locomotive Firemen and Enginemen, who was recalled to present rebuttal evidence took exception on November 8 to the statement of Mr. Jeffers that the unions were not as democratically organized as formerly. He explained that all wage requests were formed by the officers and then referred to the employees by means of a referendum vote. Policies of the organization, he said, are controlled by the delegates to each convention who number more than 1,000. Mr. Robertson also described working conditions of firemen, discussed the differences of opinion as to the number of men involved in the arbitration, referred to the history of arbitration awards and presented an original tabulation of earnings of employees on the four railroad divisions used by the carriers in their earlier testimony.

Presentation of rebuttal evidence by Mr. Robertson for the employees was completed on November 8, and the Brotherhood case was concluded on November 9, following Mr. Robertson's cross examination by H. A. Scandrett, attorney for the carriers and vice-president of the Union Pacific. The board set November 10 for the beginning of oral argument by the employees.

## Communications and Books

### Freight Car Derailments

TO THE EDITOR:

PRESCOTT, ARIZ.

The article on freight car derailments appearing in your issue of October 22 is very timely, but still leaves much to be said on the subject.

Investigation of derailments after they occur are seldom satisfactory or conclusive. Therefore little progress is made in correcting the conditions responsible for them. Derailments of highly loaded cars on tangent track are, no doubt, correctly charged to car roll which becomes excessive under uneven track conditions and is still further increased by too much side bearing clearance. The element of speed, however, is an important factor. When the low spots in the track occur at nearly regular intervals and synchronize with the sway of the car, the rolling motion increases until derailment occurs. The condition of the track at that particular place may not be any worse than at others. It is true, too, that other cars with equal or more side bearing clearance do not derail, the only apparent reason being that the synchronizing effect is absent.

It is not unusual on districts with 10 to 18-deg. curves to have derailments when entering and leaving curves where both the track and truck conditions are practically perfect. The cause has to be looked for elsewhere.

In such cases it is usually found that new cars equipped with type D couplers are involved, in which the side motion of the coupler shanks is restricted owing to the drawbar key being too close a fit in the shank. When such a car is loaded and is placed next to an empty, it will frequently derail the empty and thus escape observation itself as well as lead up to false theories of the cause of the derailment as it is sought for on the derailed car.

Such a condition was forcibly illustrated at a recent derailment investigation where an empty car moving behind a loaded new furniture car was derailed coming out of a 10-deg. curve. After rerailling the empty, the furniture car was placed next to the wrecker in movement to the terminal and in that position the truck of the furniture car derailed coming out of a curve. When the car was placed on the repair track for inspection, it was found that the center plates were free and well lubricated, the side bearing clearance correct, and all wheels and trucks in perfect trim, but that the drawbar shank had less than one inch side motion.

A close inspection of the car underneath showed that it had been off the track several times before, as the center channels had old wheel scores on both sides. Just what theories may have been advanced as to the cause of these derailments, it would be very interesting to know. Very likely it was the usual report from the track department, "nothing wrong with the track," and the car department's assurance that "the car was in the best possible condition."

The above is by no means an isolated case, but is one of many experienced with new cars, and emphasizes the extreme importance of standard 3-in. drawbar lateral as one important factor in lessening derailments.

CHARLES RAITT.

### New Books

*Five Thousand Sheet Steel Products. Compiled by the Sheet Steel Trade Extension Committee. 445 pages, illustrated. 8 in. by 11 in. Bound in boards. Price \$3.00. Published by the Committee, Oliver Building, Pittsburgh, Pa.*

This book is primarily a directory of the manufacturers of sheet steel products and marks the beginning of a new service on the part of the Sheet Steel Trade Extension committee to

buyers, sellers and fabricators of sheet steel products. It contains data on the United States weights and gages for iron and steel sheets and a list of simplified types, gages and sizes of sheets. The list of fabricators is arranged alphabetically and by states. The larger portion of the book is taken up by a list of over 5,000 sheet steel products and the names of the manufacturers who make them.

### Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,  
Bureau of Railway Economics, Washington, D. C.)

#### Books and Pamphlets

*Cotton. Bulletin No. 23 in the series "Commodity Prices in Their Relation to Transportation Costs" and dealing with the 1926 crop. 12 p. Pub. by Bureau of Railway Economics, Washington, D. C. Apply.*

*Federal Regulation of Railway Securities Under the Transportation Act of 1920, by John H. Frederick. A study made at the University of Pennsylvania. 120 p. Pub. by the Author, Philadelphia, Penna. \$1.50.*

*Verkehrswerbung bei den Eisenbahnen, by Dr. Adolf Sarter. A study of traffic sources and effective methods of traffic solicitation and railway advertising in which many will recognize the posters reproduced even if they do not understand German. 218 p. illus. Pub. by Verkehrswissenschaftlichen Lehrmittelgesellschaft m.b.H. bei der Deutschen Reichsbahn, Berlin, Germany.*

#### Periodical Articles

*Offerings in Economics in 1925-26, by L. C. Marshall. A survey of courses in economics offered in 1910-11 and 1925-26 in which it appears that in 1910-11, 392 colleges and universities offered 5,517 hours in transportation courses during the college year, and in 1925-26, 571 colleges and universities offered 19,965 hours in transportation. (p. 575, 577, 581). Journal of Political Economy, October, 1927, p. 573-612.*

*The Science of Foundations—Its Present and Future, by Charles Terzaghi. Pointing out that a classification of soils according to their behavior under load is needed in these days of larger and larger structures the author goes on to discuss experiences with foundations and what has been learned. Proceedings of the American Society of Civil Engineers, November, 1927, part 1, p. 2263-2294.*

*Sleeping-Car Service on the Russian Transcontinental Railroad, by C. E. Herring. Present-day services, arrangements about rates and reservations, and so on. Commerce Reports, October 31, 1927, p. 268.*

*Some Practical Suggestions on Utility Rate Making, by Halbert P. Gillette and Alfred S. Malcomson. Annalist, October 28, 1927, p. 661-662.*

*What Shall We Do With the Mississippi? An interview with Herbert Hoover by Robert R. Updegraff. Includes map illustrating sections affected by proposed control and transportation development plan. The Magazine of Business, November, 1927, p. 540-542, 602-612.*

THE MISSOURI SUPREME COURT has issued writs of certiorari in the three suits filed by the Missouri Pacific, the St. Louis-San Francisco and the Kansas City, Clinton & Springfield against the Missouri State Tax Commission attacking the constitutionality of Missouri's corporation franchise tax law. The three cases have been set for hearing at the April term of the court en banc.



## Looking Backward

### Fifty Years Ago

The authorities of Hardin County, Ky., demand that the Louisville & Nashville abolish the free-pass system, and make semi-annual reports to the county of the net earnings and the salary of each officer.—*Railway Age*, November 15, 1877.

An engine on the Buffalo division of the Erie recently hauled a train of 238 empty coal cars from Buffalo, N. Y., to Hornells-ville (now Hornell), 93 miles.—*Chicago Railway Review*, November 10, 1877.

The Scioto Valley [now a part of the Norfolk & Western] has been completed from Columbus, Ohio, to Portsmouth, 98 miles, and will be opened to freight and passenger traffic on December 31. Arrangements have been made for a special line of steamboats between Portsmouth and Huntington, W. Va., to be run in connection with the Chesapeake & Ohio.—*Railroad Gazette*, November 9, 1877.

### Twenty-Five Years Ago

The Chicago & Eastern Illinois, which is controlled by the St. Louis & San Francisco, will secure an entrance into St. Louis over the Big Four right of way. An agreement to be in effect for 999 years has been reached for the construction of a second track along the line of the Big Four from Pana, Ill., to East St. Louis, 76 miles, and work was started on November 5.—*Railway and Engineering Review*, November 14, 1902.

The threatened strike of switchmen in the railway terminals at Chicago has been averted by agreement upon a schedule of wage increases. Day foremen and night foremen will receive an increase of 4 cents per hour and day and night helpers will receive an increase of 3½ cents per hour, an increase which is ½ cent per hour greater than the new schedule adopted by the general managers of the St. Paul and Minneapolis railroads.—*Railway Age*, November 14, 1902.

The sweeping allegation made by the Kentucky railroad commission to the Interstate Commerce Commission, charging that various railroad companies in that state had combined to place the entire southern territory under the dominion of one man, has been denied by the railroads named but has brought out the information that the Atlantic Coast Line has contracted with J. P. Morgan & Co., for delivery by December 31 of 306,000 shares of Louisville & Nashville stock for \$50,000,000.—*Railway Age*, November 14, 1902.

### Ten Years Ago

S. J. Hungerford, superintendent of rolling stock of the Canadian Northern [now a part of the Canadian National], has been appointed general manager of the Eastern lines.—*Railway Age Gazette*, November 9, 1917.

One of the first efforts of the newly created Canadian railroads' war board is the recovery of the surplus of Canadian freight cars in the hands of American railways. It is claimed that there are 20,000 more Canadian freight cars in the United States than there are American cars in Canada.—*Railway Review*, November 10, 1917.

Somewhere in an active sector in France an entire railroad system from the general manager's office to the beat of the lonely track walker has been handed over to American railroad engineers by the French War Office, states a dispatch from the American Field Headquarters in Europe. Lieut. C. G. Brown, formerly a special apprentice on the Pennsylvania at Altoona, Pa., writes that his company has taken over parts of the Paris-Orleans shops at ———.—*Railway Age Gazette*, November 9, 1917.

## Odds and Ends

The Long Island claims to have on its payroll the oldest living railroad man in the United States in the person of Thomas Gallagher, 99 years old, former baggage master, who is now on the pension list. Despite his advanced age, Mr. Gallagher is still active and in possession of all his faculties.

One of the outstanding athletes among railway men is Ticket Collector Clarence E. Peckham of the Long Island. His specialty is marathon racing and he has made a good record in this field. This is even more remarkable considering the fact that for 12 years between 1913 and 1925 Peckham retired from athletics and did not resume his marathon racing until two years ago.

The Chicago, Burlington & Quincy has eliminated the number 13 from all passenger trains to avoid running counter to the views of prospective passengers with a dislike for this numeral. The action is the result of recommendations on the part of several soliciting agents. This should be great news to the Pullman porters who run on the Burlington. The rabbit's feet that nestle in their pockets should be ample protection, now that the baleful number is off the railroad.

In these days of national championship contests for hog-calling and husband-calling, why not a national train-calling contest? There are many who could be nominated for such an event, but two of the outstanding ones that occur to us at present are Stationmaster Guy Hassen of the Southern Pacific at San Jose, Cal., and a tall, nameless youth who calls the westbound Centuries at Albany, N. Y. For clearness and distinctness these two are excellent and their voices have the reverberating quality so necessary to the job. Both of their voices have that seductive quality which makes you want to drop what you are doing and proceed at once to Podunkus and way points.

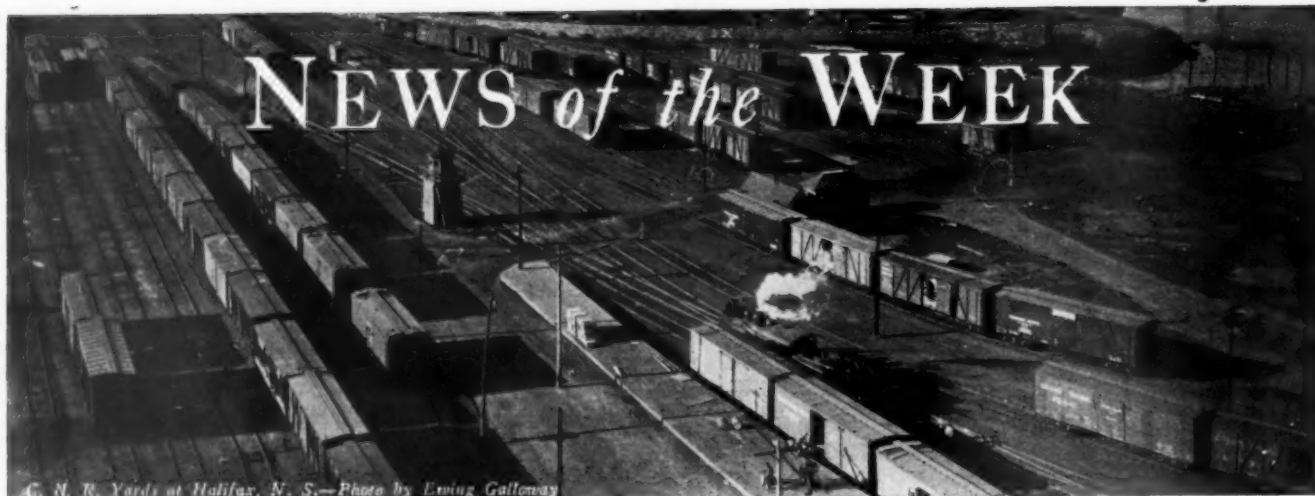
### Conductor Awarded for Bravery

John Minnick, a freight conductor on the Chicago & North Western, was tendered a dinner and presented a gold watch by the company on October 24 for bravery in connection with the saving of a train of tank cars filled with gasoline. The train had been set on fire when a drawbar dropped to the center of the track and in doing so broke the outlet cap underneath a car which contained gasoline and a spark ignited the liquid. When the train came to a stop the fire had spread under 15 or 20 cars. Conductor Minnick took the first 13 cars of the train to Lusk, Wyo., a mile from the accident, set them on a



Cars Were Coupled in Intense Heat

side track, then coupled onto three empty tank cars, returned to the scene of the fire, coupled onto the two burning cars and dragged them to a safe distance. Sufficient heat had generated to warp the rails badly under the two burning cars and while pulling them away from the train the rear trucks derailed, but regardless of this, he continued to pull them to a safe distance from the balance of the train. He and other members of the crew then returned to the cars, standing over the fire and extinguished the blaze with gravel.



THE BIRMINGHAM CAR FOREMEN AND CAR INSPECTORS' ASSOCIATION will hold its next meeting on November 14, with a general discussion on billing repair cards.

CLERICAL AND FREIGHT STATION EMPLOYEES of the Chicago & North Western to the number of 6,000 have been granted increases in wages by an arbitration board which has been hearing the demands for increases of 15 cents an hour since September 9. The clerks, whose average pay was \$4.40 a day, were given a seven per cent raise and the freight handlers, whose average pay is 47 cents an hour, were granted a four per cent increase.

THE CHICAGO, ROCK ISLAND & PACIFIC on November 2 celebrated the 25th anniversary of the Golden State Limited train and the fiftieth anniversary of the inauguration of the dining car service on the road; and passengers on the six Golden State Limited trains between Chicago and the Pacific Coast were served cake from 50-lb. birthday loaves. The first all-Pullman Golden State Limited train departed from Chicago over the Rock Island on November 2, 1902.

#### International Rate Adjustment

An unusual situation has arisen in connection with the Dominion Railway Board's disposition of the general equalization of rates case. Five general orders, based on the judgments in that case, were issued at Ottawa some time ago and dealt, in a general way, with the various applications made to the Board by individuals, as well as with the questions passed on to the Board by the Federal government.

Among those individual applications were many cases of an international character, involving decision on rates on goods moving across the boundary line between Canada and the United States. As these international rate cases developed the Board set them aside to be considered at a separate hearing. Such a hearing to dispose of solely international cases is believed to be unprecedented.

Some time early in the new year the Board will hold this hearing on international rate cases, and it is expected at that time that the suggestion frequently made

that an international railway board should be established to deal with such matters will be fully discussed by counsel both for the shippers and the Canadian railways.

#### Long Runs Cut Shop Work

The St. Louis-San Francisco reduced its roundhouse expenses \$85,000 during the first five months of this year as compared with the first five months of last year as a result of the lengthening of passenger and freight locomotive runs for varying distances—from 125 to 500 miles—and the further extension of this practice is expected to bring an additional saving of almost \$250,000 a year. These runs, which are made from St. Louis, Mo., to Oklahoma City, Okla., 542 miles, and from Kansas City, Mo., to Birmingham, Ala., 635 miles. One test, with a new coal-burning freight locomotive was on a run of 2,940 miles without having the fires dropped. These long runs are eliminating the need for intermediate shop and roundhouse facilities. Forces at the intermediate terminals at Francis, Okla., Afton and Lawton; Newburg, Mo., and Thayer; and Fort Scott, Kans., have been reduced because of lack of work. Other intermediate terminals on the Frisco's various divisions are beginning to experience a reduction of work by reason of the performance of new locomotives with which the road has been replacing older ones and reductions are being made in the shops at Neodesha, Kans., and Chaffee, Mo.

#### "Bureau of New Ideas"

The foregoing is the heading of a placard, addressed to employees of the Pennsylvania Railroad, which has been posted on employees' bulletins throughout the system, announcing the establishment of this bureau to encourage helpful suggestions for improvement of the service from employees; the idea being to invite free communication from all employees in all departments—on the road, in the shops, at stations, in yards, offices and elsewhere. All suggestions which are adopted will be accorded due recognition. The headquarters of the bureau will be in Room

241, Broad Street Station, Philadelphia, and will be in charge of R. V. Massey, assistant vice-president in charge of personnel.

Employees' names will not be made public without permission, and arrangements will be made for the prompt consideration of all suggestions, by persons competent to pass judgment.

#### Long Island Advertisements

"Railroad Service from A to Z" is the title of an advertisement recently published by the Long Island Railroad in local newspapers, terminating a series of 24 brief essays acquainting the public with the aims and activities of the road. So many and varied are the forms in railroad service that it was deemed desirable to tie the published matter to the alphabet, and so the successive advertisements were entitled: Accessibility, Betterments, Confidence, Diagonal Street Terminal, Efficiency, Fairness, Grade Crossings, History, Interline Tickets, Jamaica Station, Knowledge, Lost Articles, Montauk, Necessity, Optimism, Population, Queensborough, Recreation, Service, Time Tables, Utilities, Vision and Wages. Abstracts of the material presented in each advertisement are published in the railroad company's bulletin for October, volume five, number two.

#### Candidates for I. C. C.

Appointment of J. F. Shaughnessy, chairman of the Nevada Railroad Commission, as a member of the Interstate Commerce Commission to succeed H. C. Hall when he resigns, was recommended to the President on November 3 by Senator Oddie of Nevada. Among others whose names have been placed before the President is P. J. Farrell, chief counsel of the commission. There have also been several callers at the White House to urge the re-appointment of Commissioner Esch, whose term expires at the end of the year.

Two candidates for appointment to the Commission were presented to the President on November 7. Senator Trammell of Florida presented the name of former Representative Frank Clarke, of Florida,



and Senator Kendrick of Wyoming presented the name of David J. Howell, of Cheyenne, Wyo., formerly attorney general of Wyoming.

A committee representing the Chicago Association of Commerce called on the President on November 7 and urged him, in making appointments, to choose men who will look at questions coming before them with a nation-wide rather than a sectional viewpoint.

### Pan-American Rail Route Revised

A revision of the Pan-American railroad route, between New York and Buenos Aires, was approved by the governing board of the Pan-American Union at a meeting in Washington on November 2. The chief change was to abandon the old proposed route along the crest of the Andes in favor of a route east of the Andes along the Andean plateau, running through Bolivia and Brazil instead of through Ecuador and Peru, as originally projected. Connections with the two latter countries are proposed, however. The reason given was the growing interest in the rich hinterland of the plateau and the fact that the line would thus cross the headwaters of some of the great rivers which flow to the Atlantic Ocean.

A report of the Pan-American railway committee says that rail communication now exists from the chief railway centers in the United States through Mexico to Central America and that all of the route to the Panama Canal Zone will be complete by 1928 except for 460 miles between La Union on the Gulf of Fonseca and Panama. The chief link yet to be completed in the total of 10,230 miles is between Bogota, Colombia, and Santa Cruz, Bolivia.

### Seek Federal Aid for Abitibi Southern

Opposition to a revival of the subsidy system is the chief obstacle to any Federal aid to the building of the Abitibi Southern, which was incorporated in a bill passed by the Quebec Legislature in 1925, the proposed route to be from Amos, in the Rouyn mining region of northwestern Quebec, to Mont Laurier and Maniwaki, termini of two Canadian Pacific branches running north from Montreal and Ottawa, respectively. A deputation interested in the building of this line waited last week upon Charles A. Dunning, Minister of Railways and Canals, and Graham A. Bell, Deputy Minister. The delegation consisted of Major H. J. Lyons and Barnard Granville, of New York city, who are asking provincial and federal subsidies amounting to \$6,400 a mile.

During the session of 1925 the Quebec legislature passed legislation incorporating the Abitibi Southern, the proposed mileage of which would be 240. Survey work has been completed, but no construction work has been undertaken. Major Lyons and Mr. Granville represent a United States syndicate prepared to furnish the capital to build the road, but they want subsidies. The New York capital available is said to be \$10,000,000.

## Traffic

The Interstate Commerce Commission has published an index, with a brief history, of Interstate Commerce Commission cases which have been reviewed by the federal courts from 1887 to 1927, including all cases appearing in earlier editions, all supplemented and revised up to date.

Loose practices in handling unbilled coal at the mines in Illinois and Indiana were corrected at a joint meeting of coal operators and representatives of the roads at Chicago on November 3. The rules, contained in the Car Service Division circular CS-31, formulated by the roads in 1919 and revised in 1925, to govern uniformly the rating of other than anthracite coal mines and the car distribution to such mines, were violated prior to the coal strike which started last spring and operators, in several instances, were allowed to store coal in cars at mine tipples or on railroad property unbilled. With the resumption of mining, fewer cars are available and it is necessary again to adhere to the rules.

The Interstate Commerce Commission has issued a decision on a complaint filed by the Artemus-Jellico Railroad, a short line in Kentucky, finding the divisions accorded it by its connections of interstate joint rates on bituminous coal to be unjust, unreasonable and inequitable to the extent that they have been since November 5, 1925, and for the future will be, less than 25 cents a ton. The short line had asked for a division of 45 cents, whereas its average division for the year 1925 was 21 cents. The commission in its report said that the record is not convincing that complainant's difficulties are principally traceable to lack of fair divisions, but that "paucity of traffic seems to constitute the chief reason for its failure to earn a fair return"; and that the fact that it has not earned a fair return "does not necessarily entitle it to an increase in divisions that will produce such return."

### Freight to Devastated New England

Because of the New England flood situation the Interstate Commerce Commission on November 8 issued Service Order No. 47 declaring that an emergency exists and ordering that freight to and from New England states be forwarded by routes most available to expedite its movement and prevent congestion, without regard to the routing ordered. The order also suspends the car service rules in so far as they may conflict with the direction given in the order.

### Larger Attendance at Regional Board Meetings Urged

An appeal for increased interest in and support of the shippers' regional advisory boards has been addressed to users of railroad transportation by H. G. Taylor,

of the Car Service Division, A. R. A. These boards have recently set up new records of attendance in all districts but a still wider membership and a still larger attendance is desirable. "Admittedly, present transportation conditions are satisfactory \* \* \* The danger is that we may accept this condition in a matter-of-fact manner, and be too prone to forget the distressing conditions of past years."

### Waterway Transportation Survey to Be Started Immediately

A survey of available traffic for inland waterway transportation on the Mississippi and Warrior rivers is to be started immediately by the Department of Commerce at the request of the Secretary of War. Norman F. Titus, chief, Transportation Division, Department of Commerce, announced that M. R. Beaman, traffic manager, South Jersey Port Commission, had been granted leave of absence by New Jersey authorities to direct the field work. He will be assisted by H. C. Davis and L. P. Nickell, Department of Commerce. Headquarters for the field staff has been opened in the branch office of the Commerce Department, at St. Louis, Mo.

### Class Rates to and from Florida Peninsula Ordered

The Interstate Commerce Commission on October 31 made public an order directing the railroads to put into effect by December 31 class freight rates to and from points in the peninsula of Florida, based on the scales prescribed in its reports on its Southern class rate investigation. The investigation was instituted on February 6, 1922, and the commission has issued reports and supplemental reports of its findings on July 7, 1925, April 13, 1926 and July 19, 1927, but has heretofore not entered orders requiring compliance with its findings. All of the railroad respondents except the Atlantic Coast Line, the Florida East Coast and the Seaboard Air Line have signified their willingness to accept the findings and have proceeded with the work of carrying them into effect. The three Florida roads, however, have notified the commission that they are unwilling to proceed with the work of putting the rates into effect to and from the points in the Florida peninsula unless definitely directed to do so by the commission. They urged the maintenance of the basis that has been in effect, which uses separate factors of the through rates to cover that portion of the through movement south of the Florida gateways. The commission's order takes the form of prohibiting the railroads from exceeding the rates prescribed.

### Cotton Distribution Not Restricted by Freight Costs

That cotton distribution is not restricted by the cost of transportation is shown by a study just completed by the Bureau of Railway Economics of cotton production and distribution and the effect of freight rates on prices received by the grower.

"During the period from 1910-1915," according to a bulletin issued by the bureau,

"the annual difference between the price of cotton at Liverpool and on the farms of the United States was \$2.72 per hundred pounds. In the period from 1916-1920, the average was \$12.04, while in the period from 1921-1926, it was \$5.32. The differences presumably cover all costs of transportation by rail and water and such other costs of handling as commissions and insurance, and profits, if any. Export rail rates on cotton in the United States represent a comparatively small part of these differences. The export rates, which include terminal expenses in getting shipments to shipside, averaged between 75 and 85 cents per 100 lb., during the four crop years (1923-1926), which was from 14 to 16 per cent of the cost of taking the cotton from the American farmer to Liverpool.

"Compared with the delivered prices, the cost of rail transportation of cotton in the United States averaged but 3 per cent of the Liverpool price."

The Southern cotton growing states have forged to the front as the center of the cotton spinning industry. Since 1923, there has been a gradual decrease in the number of spindles in place in the New England states, while in the Southern states there has been a progressive increase. The South is credited with 62.3 per cent of the total spindle hours worked in 1926, according to the report, as against 33.6 per cent in the New England states and 4.1 per cent in all other states. Of the total domestic cotton consumed in the United States in 1926, the South used 71.5 per cent, the New England states 22.9 per cent and the remaining states 5.6 per cent.

### Railways Ask 40 Per Cent Increase in Mail Rates

Voluminous briefs have been filed with the Interstate Commerce Commission in the railway mail pay case, which was reopened by the commission on request of the Railway Mail Pay Committee, by the New England lines and by 173 associated short lines; and also in behalf of the Postmaster General.

The Railway Mail Pay Committee asks an increase of 40 per cent in the trunk line rates, pointing out that although the commission increased the rates in its decision of 1919 the administration of the space basis of payment has been such that the roads have received very little compensation for a continued increase in the weight of mail carried, which has practically doubled.

The short lines ask that separate rates be made to meet the conditions on the different lines, stating that the application of formulas worked out for application to the trunk lines would work out very inequitably if applied to some of their individual situations.

The New England lines also ask separate consideration, while the Postmaster General contends that the roads are already receiving from the transportation of the mails an excessive return on their investment and he has submitted a plan which would result in a reduction.

The Railway Mail Pay Committee brief says that the postal revenues of 1926 were 200 per cent of those in 1917, estimated

ton-miles of mail carried, 192 per cent, and postal revenue per authorized car-mile of railroad service, 205 per cent, of those of the year which was taken as the statistical basis for the commission's order of December 23, 1919. "Despite the fact that the volume of mail carried has doubled," it says, "the space authorizations upon which the carriers' pay depends under the space basis (expressed in the equivalent of 60-foot car-miles) have actually declined since 1917, so that in 1926 they were but 97 per cent of those authorized in 1917. During the same period the compensation paid to the railroads per ton-mile has decreased from 8.984 cents in 1917 to 6.084 cents in 1926, and is now but 68 per cent of the revenue per ton-mile in 1917, notwithstanding the increase in rates established by the commission's order. During the same period railway operating expenses and taxes per train-mile have increased 70 per cent."

Total mail pay of the railroads in 1917 was \$74,165,246, in 1919 it was \$84,301,061, and in 1926 it was \$96,326,466. It is also asserted in the brief that subsequent to the increase in mail rates allowed by the commission, further substantial increases in freight and passenger rates were made in 1920 to correspond to increased costs of railway operation but that no further advances were made in the rates for the transportation of mail. The brief continues:

"Although it is true that compensation to the railroads for carrying the mails is on the basis of authorized space and not of weight or tonnage, the Postoffice Department is paid on the basis of weight. Likewise a large and probably increasing proportion of mail matter consists of parcels post, handled in competition with express and less than carload freight. Furthermore, while the carriers in this case are not attacking the space basis or suggesting a return to the weight basis, and while their case depends primarily upon the statistical study, the fact that the railroads are now carrying twice the volume of mail matter which was handled in 1917 is not without its significance as bearing upon the cost as well as the value of the service rendered. Had there been no increase in wages, taxes, cost of materials, and other operating expenses, a scale of rates under which though volume has doubled the total compensation has remained stationary, and under which the same rate per car mile is paid for double the load, on the basis of cost alone, to say nothing of the value of the service, is unreasonably low as applied to such changed conditions."

The short line brief rests the right of each line individually to just compensation upon the fifth amendment to the Constitution. It also points out that the railroads are required by law to carry the mails. While the dispute between the department and the larger roads is to a large extent concerned with the proper method of apportioning the space in trains to the different classes of service, the short lines have worked out figures representing the increases sought for each line on the elements of compensation or damages that would be used in a condemnation proceeding under the power of eminent domain.

## Equipment and Supplies

### Locomotives

THE ALGOMA CENTRAL & HUDSON BAY contemplates buying 2 locomotives.

THE NEWBURGH & SOUTH SHORE contemplates buying 4 eight-wheel switching locomotives.

THE MEXICAN RAILWAY COMPANY, Ltd., is inquiring, through the builders, for from 2 to 4 Pacific type locomotives.

THE CANADIAN NATIONAL has ordered 10 eight-wheel switching locomotives, from the Baldwin Locomotive Works. These locomotives are for service on the Grand Trunk Western Lines. Inquiry for this equipment was reported in the *Railway Age* of October 29.

### Freight Cars

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA is inquiring for 200 50-ton gondola cars.

THE CHICAGO & NORTH WESTERN is inquiring for 500 50-ton hopper car bodies, 500 70-ton hopper cars, 200 50-ton flat cars, 25 caboose cars and 100 70-ton mill type gondolas.

THE KIRIN HAILUNG, China, has ordered 30 box cars, 20 flat cars, 24 high-side gondola cars, and 40 low-side gondola cars, all of 40 tons' capacity, from the Koppel Industrial Car & Equipment Company.

### Passenger Cars

THE MAINE CENTRAL has ordered 2 combination baggage and mail cars from the Osgood Bradley Car Company. Inquiry for this equipment was reported in the *Railway Age* of October 8.

### Machinery and Tools

THE CHICAGO, BURLINGTON & QUINCY is inquiring for one 52-in. carwheel lathe.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for one 80-in. driving wheel lathe and one alligator shear.

THE CENTRAL OF GEORGIA has ordered a 6,000-lb. double frame steam hammer, from the Niles-Bement-Pond Company.

THE NORTHERN PACIFIC has ordered one 10-ton gantry crane for use in Minneapolis, Minn. from the Whiting Corporation.

THE NORFOLK & WESTERN is inquiring for 104 machine tools, including 4 planers, 2 radial drills, 5 boring mills, 1 forging machine, 1 air hammer, 11 lathes, 1 shaper, 1 forging press, 6 electric hoists, 2 electric



overhead cranes, 2 bolt threaders, 2 boring bars, 4 planers, 1 centering machine, 4 drills, 1 drill thinning machine, 23 grinders, 4 power hammers, 2 milling machines, 1 oil grooving machine, 3 pipe threading machines, 1 rod grinder and 1 pattern worker.

## Iron and Steel

THE CHESAPEAKE & OHIO has ordered 6,500 tons of steel for its Cincinnati viaduct from the Fort Pitt Bridge Company.

THE ST. LOUIS-SAN FRANCISCO has ordered 35,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

THE NEW YORK CENTRAL is inquiring for 100 tons of steel for a bridge at Buffalo, N. Y., and 200 tons additional for various bridges.

THE CHESAPEAKE & OHIO ordered 2,037,750 tie-plates from the Wheeling Steel Corporation, Wheeling, W. Va., and 4,037 kegs of track spikes from the Tredegar Company, Richmond, Va.

THE ERIE has ordered 24,000 tons of rails from the Carnegie Steel Company, 13,700 tons from the Illinois Steel Company, 7,000 tons from the Bethlehem Steel Company and 2,000 tons from the Inland Steel Company.

THE AMERICAN RAILWAY EXPRESS COMPANY'S building on the line of the New York, New Haven & Hartford in the Borough of the Bronx, New York City, calls for 1,000 tons of steel, for which contract has been let to the Jones & Laughlin Steel Company.

## New York Central Orders Rails

The New York Central Lines let contracts involving the expenditure of approximately \$7,600,000, covering the purchase of steel rails for delivery next year.

The total tonnage of rail involved is 177,140 tons, which was distributed among manufacturers as follows:

Bethlehem Steel Company.....	83,340 tons
Illinois Steel Company.....	67,950 tons
Inland Steel Company.....	15,000 tons
Carnegie Steel Company.....	10,850 tons

Total ..... 177,140 tons

Of this tonnage 70 per cent is ordered for immediate specification and the balance is optioned for order prior to March 1, 1928.

## Signaling

THE BOSTON & MAINE has ordered from the Union Switch & Signal Company, 49 electro-pneumatic switch layouts for East Somerville, Mass., and Tower H, Boston, together with additions for the machines in the cabins.

THE NEW YORK CENTRAL has ordered from the General Railway Signal Company an electric interlocking for Signal Station 27 at Rochester, N. Y. The machine is type 5A, 165 working levers and 59 spare spaces. The order includes switch machines, relays, transformers, etc., and 45 searchlight dwarf signals.

## Supply Trade

The Truscon Steel Company will enlarge its sash and steel window departments at Youngstown, Ohio.

Edwin S. Woods & Co., Chicago, have removed their offices from 230 S. Clark street to the Railway Exchange, 80 E. Jackson Boulevard.

The Lehon Company, Chicago, has moved its New York office from 60 Broadway to room 430, 165 Broadway. F. T. Carpenter will continue as eastern manager of railway sales.

Edwin H. Lundgron, for the past four years general sales manager of the Combustion Engineering Corporation, New York, has been elected vice-president and general sales manager.

J. C. Whitridge, vice-president of the Buckeye Steel Castings Company, Columbus, Ohio, has been elected president to succeed S. P. Bush, resigned, and will be succeeded by J. B. Goodspeed.

Melvin J. Evans, who has been appointed sales manager for the Whiting Corporation, Harvey, Ill., graduated from the University of Wisconsin in 1913 and in the same year became a special apprentice in the mechanical department of the Atchison, Topeka & Santa Fe. Later he was employed in the mechanical assembly and boiler shops and the engine house and in other capacities. During the war he served



M. J. Evans

as a lieutenant in the ordnance department and at the close of the war returned to private life as assistant to the vice-president of the Doehler Die Castings Company, Brooklyn, N. Y., which position he held for three years. He then became works manager of the Chicago plant of Templeton, Kenly & Co., Ltd., and after three years entered the employ of the Republic Flow Meters Company, Chicago, as sales manager, which position he has held until his recent appointment.

Errett Bishop, who has been employed in the operating department of the Electric Storage Battery Company, Philadelphia, Pa., for several years, has been assigned to railway signal engineering service work with headquarters at the general offices, Philadelphia. Mr. Bishop will render engineering service in connection with signal and allied storage battery applications on the railroads of



Errett Bishop

the Atlantic seaboard and as far west as the Ohio river. Mr. Bishop was born on December 25, 1887 at Utica, Miss. He was educated in the public schools, later graduating in the electrical engineering course of the Mississippi A. & M. College in 1907. Prior to entering the employ of the Electric Storage Battery Company, he was engaged in electrical work at various places in the United States and its Island possessions. On leaving college, he spent one year with the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., on the graduate students' apprenticeship course. He then was engaged in electrical construction work on the Pacific Coast and elsewhere, after which he went with the Manila Electric Railway & Light Company. Mr. Bishop was later employed by the Government of the Philippine Islands as electrical engineer, and then served as superintendent of power plants, transmission lines and sub-stations, with the Porto Rico Railway Light & Power Company.

Joseph Wainwright for many years associated with Manning, Maxwell & Moore, has joined the sales organization of the Consolidated Machine Tool Corporation of America, with headquarters at Rochester, N. Y.

The Kulp Theft-Proof Lamp Company, Chicago, has entered into contract with the General Electric Company and the Westinghouse Lamp Company under the terms of which the two lamp manufacturers are to supply

lamp users with Kulp Theft-Proof base under present Mazda lamp contracts.

**The Kearney & Trecker Corporation,** Milwaukee, Wis., has opened a new factory branch office and showroom at 5924 Second Boulevard, Detroit, Mich., in charge of **R. W. Burk**, assisted by **George E. Gustafson** and **William Mirgeler**.

**Russell Wallace**, vice-president of **Crerar, Adams & Co.**, Chicago, has been elected president to succeed **E. F. Shepherd**, deceased. Mr. Wallace was born on January 23, 1864, at Beachville, Ont., and entered railway service in 1880 as a clerk in the store department of the Michigan Central at West Detroit, Mich. From 1881 to 1888, he was a clerk in the office of the purchasing agent and in the latter year was appointed purchasing agent of the Duluth, South Shore & Atlantic, which position he held until 1890 when he was appointed purchasing agent of the Chicago & West Michigan, the Detroit, Lansing & North-



Russell Wallace

ern and the Saginaw Valley & St. Louis (now parts of the Pere Marquette). On January 1, 1900, he entered the employ of the Pere Marquette as purchasing agent of the Grand Rapids division, which position he held until March of that year when he resigned to become associated with **Crerar, Adams & Co.** From the latter time until 1914 he has been assistant to the vice-president, general sales manager and secretary. In 1914 he was promoted to vice-president, which position he has held until his recent election.

#### **Manning, Maxwell & Moore, Inc. Organizes Subsidiaries**

Manning, Maxwell & Moore, Inc., New York, for the better handling of its business, effective as of October 1, 1927, has organized two operating companies under the laws of Delaware called respectively the **Consolidated-Ashcroft-Hancock Company, Inc.**, and the **Shaw Crane-Putnam Machine Company, Inc.** These new operating companies were formed to take care of the expanding engineering and manu-

facturing interests of Manning, Maxwell & Moore, Inc., which owns 100 per cent stock of both the new corporations.

The Bridgeport and Boston plants of Manning, Maxwell & Moore, Inc., consisting of the **Hancock Inspirator Company** and the **Hayden & Derby Manufacturing Company**, Boston, Mass., and the **Ashcroft Manufacturing Company** and the **Consoli-**



C. A. Moore, Jr.

dated **Safety Valve Company**, Bridgeport, Conn., and the sales force marketing the products of these plants will make up the **Consolidated-Ashcroft-Hancock Company, Inc.** The operations of this company will include the development of new devices for power plants, steam locomotives and marine service, as well as the sale and manufacture of the present extensive line of steam specialties.

The **Shaw Crane-Putnam Machine Company, Inc.**, takes over the **Shaw Electric**



F. J. Baumis

**Crane Company**, Muskegon, Mich.; the **Putnam Machine Company**, Fitchburg, Mass., and the sales activities pertaining to them. The operations of this company will include the engineering development of new mechanical machines and devices, as well as the manufacture and sale of the present line of electric traveling cranes, heavy machine tools for industrial and railroad service, and special production machinery.

The supplies department and the Chicago

machinery branch office of Manning, Maxwell & Moore, Inc., operate as formerly.

This arrangement has been made after long consideration of the diverse and unrelated parts of the business of Manning, Maxwell & Moore, Inc., and is intended to co-ordinate the several parts of the business more adequately.

The officers of Manning, Maxwell & Moore, Inc., are: **C. A. Moore, Jr.**, president; **H. D. Carlton**, **E. M. Moore**, **F. J. Baumis** and **J. D. Nicklis**, vice-presidents; **F. W. Knowles**, controller, and **F. M. Kreiner**, secretary and treasurer.

The officers of the **Shaw Crane-Putnam Machine Company, Inc.**, are: **C. A. Moore, Jr.**, chairman board of directors; **F. J. Baumis**, president; **F. W. Knowles**, vice-president and controller; **F. M. Kreiner**, secretary and treasurer; **E. L. Fickett**, assistant to president.

The officers of the **Consolidated-Ashcroft-Hancock Company, Inc.**, are: **C. A. Moore, Jr.**, chairman board of directors; **H. D. Carlton**, president; **W. H. Williston**, vice-president; **C. H. Graesser**, vice-



H. D. Carlton

president; **F. M. Kreiner**, secretary and treasurer; **F. W. Knowles**, controller.

All companies have headquarters at 100 East Forty-second street, New York. The oldest unit, the **Putnam Machine Company**, started business in 1836; the **Ashcroft Manufacturing Company** in 1852; **Manning, Maxwell & Moore** in 1873 and the **Hancock Inspirator Company** in 1877.

**A. E. R. Turner**, district sales manager of the **Niles Tool Works Company**, Hamilton, Ohio, with headquarters at Cleveland, Ohio, has resigned to become district sales manager of **John Bertram & Sons Company, Ltd.**, Dundas, Ont., with headquarters at Montreal, Que., and will be succeeded temporarily by **James D. Allan**.

The **Davenport Locomotive Works** has been reorganized. The manufacturing plant and entire business of the **Davenport Locomotive Works** has been acquired and will hereafter be conducted by the **Davenport Locomotive & Manufacturing Corporation**, Davenport, Iowa. The building of locomotives, also the production of grey iron castings,



forgings, boilers and fabricated sheet metal, machining work, etc., is retained by the new corporation.

**The Gould Car Lighting Corporation** announces the sale of its patents, patent rights, trade marks, and good will in its car lighting business to the **Simplex Equipment Company, Inc.**, New York. The Gould Corporation is retiring from the car lighting field because that department of its business, due to unsatisfactory prices and limited market, has not been profitable. The Simplex Equipment Company, Inc., will be in position to service and maintain all types of Gould equipment.

**Frank K. Tutt**, vice-president of the Hanna Stoker Company, Cincinnati, Ohio, with headquarters at St. Louis, Mo., has resigned to become special representative of the **Bird-Archer Company** with headquarters at Chicago. He was born on December 30, 1876, at Lexington, Mo., and entered railway service in August, 1891, with the Missouri Pacific. Later he was associated with the Southern, the St. Louis-San Francisco, the Denver & Rio Grande Western, the Missouri Pacific and the Missouri-Kansas-Texas. In February, 1924, he resigned from the latter road as mechanical superintendent to become a representative of the Hanna Stoker Company and in the following year was appointed sales manager and later vice-president which position he has held until his recent appointment.

## Obituary

**John R. Mitchell**, representative of W. H. Miner, Inc., Chicago, died in that city on November 7.

**James Powers**, inventor of the Powers tabulating machine, died on November 8 at the Hotel Winthrop, New York City, at the age of 57.

**P. M. Johnston**, railroad contractor, died at his home at St. Elmo, Ill., on September 27 at the age of 80 years. Since his first entry into the railroad contracting business about 1870, Mr. Johnston and his associates, through five different companies, constructed about 3,079 miles of steam railroad lines in the central and southern states.

## Trade Publications

**PROTECTING CONCRETE SURFACES.**—A special circular issued by the Minwax Company, New York, directs attention to failures of concrete due to absorption of water through exposed surfaces and quotes several authorities on the necessity for thorough protection from this cause of disintegration. It also illustrates and describes the use of Minwax transparent waterproofing treatment for the purpose of developing a layer of impervious concrete adjacent to the surfaces treated.

## Construction

**CENTRAL OF GEORGIA.**—The contract let by this company for the construction of a station at Thomaston, Ga., to cost approximately \$25,000, was let to the Williams Lumber Company, of Columbus, Ga., and not to Hugger Brothers, of Montgomery, Ala., as reported in the *Railway Age* of November 5.

**CHICAGO & NORTH WESTERN.**—Plans have been prepared by this company for the construction of a 1,000,000-bu. reinforced concrete addition to the grain elevator at Council Bluffs, Iowa. The cost of the addition is estimated at \$350,000.

**MISSOURI PACIFIC.**—Company forces have started upon a program of improvement of yard and terminal facilities at Poplar Bluff, Mo., which is expected to involve a total expenditure of about \$180,000. Included among the improvements are the acquirement of additional right of way, construction of additional and longer yard tracks with rectification of alignment, the replacement of a 75-ft. turntable with a 100-ft. turntable, the installation of an additional cinder conveyor, the installation of a 100,000-gal. steel tank with necessary pipe lines and additional water columns, the construction of boiler house with elevated track and coal pocket and the installation of a boiler and two air compressors.

**ST. LOUIS-SAN FRANCISCO.**—Plans are being prepared by this company for the

construction of a passenger station at Poplar Bluff, Mo. It is expected that a request will be made for bids about December 1.

**TEXAS & PACIFIC.**—This company plans the construction of a steel bridge 1,900 feet long over the Atchafalaya river near Melville, La. The bridge will consist of one vertical lift span, capable of being raised to a point 53 feet above maximum flood height, and having a clear span of 160 feet, and five fixed spans, that will be placed 3 feet above maximum flood height.

**TEXAS & PACIFIC.**—A contract has been awarded to Gifford-Hill & Co., for the construction of a water supply reservoir two and one half miles north of Wills Point, Tex., to cost about \$75,000. This project involves about 50,000 yards of grading, construction of pump house with installation of pumping machinery and construction of pipe line one mile in length, to connect reservoir with service tanks on main line at Wills Point. The same contractor has been given a contract for the removal of rail on the abandoned Midland & Northwestern between Midland, Tex., and Seminole, 60 miles. Bids have been closed for remodeling and enlarging the combined freight and passenger station at Midland, Tex., at a cost of about \$15,000.

## Railway Finance

**ATLANTIC COAST LINE.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority to nominally issue \$74,596,244 of its general unified 4½ per cent bonds, Series A, now held in its treasury, in exchange for and in retirement of certain other bonds and to reimburse the treasury to the extent of \$70,718,010 for expenditures for additions and betterments and acquisition of additional property for the period from January 1, 1914, to December 31, 1926.

**CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—Equipment Trust.**—The Interstate Commerce Commission has authorized an issue of \$830,000 of equipment trust certificates, to be sold at not less than 101.52 and interest.

**CINCINNATI UNION TERMINAL COMPANY.**—Articles of incorporation for this company which is to undertake the construction of a union passenger station and accompanying facilities at Cincinnati, Ohio, have been filed with the Secretary of State of Ohio at Columbus. The construction of the station is to be financed through

the purchase by the railroads involved of \$3,500,000 of common stock of the Union Terminal Company and the purchase by the Cincinnati Railroad Terminal Development Company of \$3,000,000 of preferred stock, the balance of the entire cost of about \$37,500,000 to be financed by the issue of first mortgage bonds of the Union Terminal Company. Members of the first board of directors of the company are: H. A. Worcester, vice-president of the Cleveland, Cincinnati, Chicago & St. Louis; G. E. Evans, executive vice-president of the Louisville & Nashville; J. E. Crawford, general manager of the Norfolk & Western; J. B. Munson, vice-president of the Cincinnati, New Orleans & Texas Pacific; R. N. Begien, vice-president of the Chesapeake & Ohio; Robert A. Taft, secretary of the Development Company; C. W. Galloway, vice-president of the Baltimore & Ohio; T. B. Hamilton, vice-president of the Pennsylvania; George D. Crabbs, president of the Development Company; William C. Procter, president of the Procter & Gamble Company; Henry Waite, chief engineer for the board of

directors, and C. A. Wilson, consulting engineer for the board.

**KANSAS CITY, SHREVEPORT & GULF TERMINAL.—Bonds Authorized.**—The Interstate Commerce Commission has authorized this company to extend from August 1, 1927, to August 1, 1937, the maturity date of \$150,000 first mortgage bonds. The interest rate will be changed from 4 to 6 per cent.

**LAKELAND.—Acquisition.**—This company, owned by the city of Lakeland, Ga., has applied to the Interstate Commerce Commission for authority to operate as a common carrier a line of 10 miles from Lakeland to Naylor, Ga., purchased from the Milltown Air Line, under the direction of a commission of four members.

**MUSCLE SHOALS, BIRMINGHAM & PENSACOLA.—Acquisition of Tracks.**—The Interstate Commerce Commission has issued a certificate authorizing this company, controlled by the St. Louis-San Francisco through stock ownership, to acquire and operate a track owned by the Gulf Ports Terminal, extending from a point near Pensacola Bay west, 3.3 miles, and a track owned by the Gulf Power Company from a connection with the Louisville & Nashville in Tarragona Street, Pensacola, to the north bank of Bayou Grande, 4.9 miles. The Gulf Ports Terminal was recently authorized to abandon its line except for its terminal properties and it was expected that arrangements regarding the operations of the latter would be effected with the Louisville & Nashville. The commission refused to permit the Louisville & Nashville to have the joint use of the tracks in question.

**NEW YORK NEW HAVEN & HARTFORD.—Equipment Trust.**—The Interstate Commerce Commission order of November 30, 1926, permitting the issuance of \$4,995,000 equipment trust certificates, series of 1926, has been modified so as to permit the use of an unexpended balance of the proceeds for the purchase of additional equipment including 20 extension side-dump cars, 6 gasoline-electric cars and 1 switching locomotive, having a total approximately cost of \$414,928. It appears that substantial savings in the cost of assembling and equipping certain multiple-unit cars included in the original list of equipment were such as to result in an unexpended balance of \$288,355.

**NORFOLK SOUTHERN.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority to pledge \$1,966,000 of its first and refunding mortgage 5 per cent fifty-year bonds, and \$404,000 of first lien equipment trust notes, as collateral for a short term loan of \$1,500,000 from the Farmers' Loan & Trust Company of New York. The company also asks authority to sell \$1,466,000 of the bonds at 95.5 and interest, for the purpose of discharging the short-term notes.

**NORTHERN PACIFIC.—Court Refuses to Set Aside I. C. C. Guaranty Certificate.**—The court of appeals of the District of Columbia in a decision rendered on No-

vember 7, affirmed a judgment of the supreme court of the District of Columbia which had dismissed this company's petition for a writ of certiorari to review and set aside a decision and certificate of the Interstate Commerce Commission, fixing the final amount found due the company under the six-months guaranty for the period following the period of federal control. In a "corrected certificate" issued by the commission it said that the company had been overpaid in the sum of \$1,320,241 in advance and partial payments amounting to \$12,000,000, while the company had claimed that \$12,420,288 was due it, and took the position that the later certificate was beyond the scope and powers of the commission. The court finds that the commission, after issuing certificates for the earlier payments before the amount was definitely ascertained, retained jurisdiction for the purpose of increasing the award and, in the view of the court, retained jurisdiction also for the determination of the final amount necessary to make good the guaranty, whether less or greater than the amounts theretofore certified.

**UNION BELT OF DETROIT.—Trackage Agreements.**—The Interstate Commerce Commission has issued a certificate authorizing this company to operate certain tracks and facilities of the Pennsylvania, the Pere Marquette and the Wabash in and near the city of Detroit. The company was organized in the interest of these three carriers.

**GREAT NORTHERN.—Merger Hearing.**—The hearings before representatives of the Interstate Commerce Commission on the proposed merger of the Great Northern and the Northern Pacific which were begun at Minneapolis, Minn., on October 24 ended on November 5 and will be resumed in Washington, D. C. on January 16 at which time the Chicago, Milwaukee & St. Paul will introduce testimony in opposition to the consolidation. Following the latter hearing the commission expects to hold a third in Minnesota and a fourth on the Pacific coast. The outstanding development during the latter part of the hearing at Minneapolis was the denial of the motion of the Chicago, Milwaukee & St. Paul asking the commission to dismiss the case on the ground that the merger as now outlined will violate the Sherman anti-trust law.

The northern roads' case was completed by the testimony of Charles Donnelly, president of the Northern Pacific, who covered the legal and financial issues and that of Ralph Budd, president of the Great Northern, who dealt with operating and engineering phases.

Mr. Donnelly testified that when it became apparent that the provisions of the Transportation Act, calling for the formulation of a general plan, were regarded as unworkable, and that no such plan was likely to be adopted, the northern lines turned their attention to Paragraph 6 of Section 5 of the Transportation Act.

"It was at first thought that something advantageous might be developed, subject to the approval of the Interstate Commerce Commission, through the medium of a new corporation to hold the stock of the two

northern companies. It was obvious, however, that under such a plan it would be necessary to forego many of the savings that otherwise might actually be realized through the medium of unified operation and a second plan was suggested. This provided for the holding of the stock of the two companies by a holding company and involved the unification of the operation of the Northern Pacific, the Great Northern, and the Burlington, with their subsidiaries, the Burlington acting as the lessee of the unified properties. It was decided later that this plan would be objectionable to the territory served by the northern lines.

"The latter lines now have and for many years have had their headquarters in St. Paul and the transfer of the headquarters to Chicago would have been displeasing to the Northwest. Operating conditions in this territory also differ from those of the Burlington's territory. It was finally decided to adopt the present plan of unifying the operations of the Northern Pacific, the Great Northern and the Spokane, Portland & Seattle mileage in accordance with the plan stated in the application.

"This plan involves no new financing, nor does it involve any addition to the amount of stocks or bonds outstanding in the hands of the public. It allows of the exchange share for share of the stock of each of the northern lines for the stock of the new company. Its basis of exchange recognizes equality of value in those stocks. Pursuant to it, about 70 per cent of the stock of each of the northern lines has already been deposited for exchange. The plan calls also, first, for a lease to a new company to be known as the Great Northern Pacific Railway Company, a Delaware corporation, of the properties of the Spokane, Portland & Seattle; and, second, for the lease to the Great Northern Pacific Railway Company, of the properties of the Northern Pacific and the Great Northern. In general, the lease calls for the payment by way of rental, first, of the fixed charges of the Northern Pacific and the Great Northern as lessor companies; and, second, for the further payment, to stockholders of those two companies who do not exchange their stock, of amounts equal, share for share, to the dividends paid to the shareholders of the Great Northern Pacific Railway Company. The lease runs for 99 years, and on its expiration the accumulated surplus not distributed in the way of dividends during the period of the lease is to be returned to the lessor companies."

Mr. Budd's testimony indicated that the unification will ultimately reflect favorably on freight rates, give better service to the Northwest, bring more rail equipment manufacturing to that territory, expedite freight delivery in the territory served by the roads and eliminate duplication of effort in freight terminals.

Mr. Budd asserted that the large savings in operating costs would be reflected favorably in rates because rates must produce sufficient revenue in the aggregate to pay the cost of service, including a fair return on the value of the property used for transportation purposes. Direct benefits such as expedited delivery of freight, because of movement over shorter and better routes,



will also come about while the cost and time involved in handling freight to and from industrial plants will be reduced.

"Another way in which the proposed unified railway will benefit the Northwest is in its ability to enlarge upon the policy of manufacturing railroad equipment in the northwest where it is used. A large system is needed to carry out such a program successfully and there is no other railway combination which would make practicable the establishment of such industry to the same extent. The Great Northern, especially in the past seven years, has enlarged upon a policy of building equipment and has spent \$11,000,000 in such work. This, however, compares with nearly \$30,000,000 spent for equipment in the east during the same period."

He also dealt to some extent on the subject of joint use of terminals and explained that it is much easier to arrange the joint use of passenger stations than of freight terminals. In analyzing the situation as pertaining to the consolidated use of freight terminals, Mr. Budd said that the arrangement of the Great Northern and the Northern Pacific tracks, yards and freight houses is such as to lend itself effectively to merging the terminal, yards and switching operations of these two roads. "Such a system," he said, "would be more effective and economical than any possible method of having one of the roads perform the terminal work for the other or of creating a third and "neutral" transfer company to handle the switching, the deliveries at industrial plants or the interchange of freight cars.

Frederick H. Wood, chief counsel for the St. Paul road, based his motion for dismissal on the contention that the proposed merger would give the Great Northern Pacific control of the Burlington without due process of law, that is, without first applying to the Interstate Commerce Commission for authority for such control. He pointed out that the commission derives its power to authorize one carrier to acquire control of another by stock ownership, lease or otherwise not amounting to a consolidation from Paragraph 2 of Section 5 of the Transportation Act, which requires that an application be made. At the present time, the Great Northern and Northern Pacific each owns a little less than one-half of the capital stock of the Burlington. Control of the Burlington is, therefore, now divided as between the Great Northern and the Northern Pacific.

If the application be granted, the Great Northern Pacific will automatically acquire control of the Burlington as a result of the control acquired over assets of the Great Northern and the Northern Pacific without any specific application for authority to do so.

Mr. Wood moved for the dismissal of the application, first, because although the necessary effect thereof is to vest control of the Burlington in the Great Northern Pacific, no application therefor has been made as required by Paragraph 2 of Section 5; second, because if the pending application be regarded as an application for the acquisition of control of the Burlington, the application is defective under the rules prescribed by the commission in that it does not contain the averments required by the

rules of the commission to be included in such application. An application for authority to acquire control of the Burlington with the necessary averments addressed thereto was not included in the original application which has not been served upon governors and public commissions of the states affected by the Burlington as required by the rules of the commission; and third, upon the ground that if such application, notwithstanding the foregoing defects therein, be treated as an application for acquisition of control of the Burlington there is a complete lack of proof as to the manner in which such acquisition of control will affect either the Burlington, the territory served by it, or the lines with which it competes, a complete lack of proof that such acquisition of control of the Burlington would be in the public interest.

In replying to the charge of legality, Walker D. Hines, chief counsel for the northern roads, said that the proposed transfer of the Burlington control did not involve any fundamental principle, either of law or practical railway operation. He pointed out that the status of the Burlington, under the merger plan, would be unchanged from that which had existed for 25 years. Control of the Burlington would be vested in a single railway, instead of two, as at present.

#### Average Price of Stocks and of Bonds

	Nov. 9	Last week	Last year
Average price of 20 representative railway stocks..	119.30	116.58	101.78
Average price of 20 representative railway bonds..	96.46	96.18	91.70

#### Valuation Reports

The Interstate Commerce Commission has issued final valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes as for the respective valuation dates as follows:

Sunset .....	\$1,083,800	1916
Rowlesburg & Southern.....	84,250	1918
Northern Alabama .....	3,223,000	1915
Great Northern .....	382,400,000	1915

The commission has also issued a supplemental tentative valuation report finding a final value of \$1,409,745 for the Sumpter Valley as of 1916.

#### Dividends Declared

Cleveland & Pittsburgh.—Guaranteed, \$0.87½ cents, quarterly; special guaranteed, \$0.50 cents, quarterly, both payable December 1 to holders of record November 10.

Cripple Creek Central.—Preferred, 1 per cent, payable December 1 to holders of record November 15.

Georgia Southern & Florida.—First and second preferred, 2½ per cent, payable November 28 to holders of record November 14.

Maine Central.—Common, 1 per cent, quarterly, payable January 2, 1928, to holders of record December 15; preferred, 1¼ per cent, quarterly, payable December 1 to holders of record November 15.

New York, Chicago & St. Louis.—Common and preferred, 1½ per cent, quarterly, both payable January 3, 1928, to holders of record November 15.

Pere Marquette.—Common, 1½ per cent, quarterly, payable January 3, 1928, to holders of record December 10. Prior preferred, 1¼ per cent, quarterly; five per cent preferred, 1¼ per cent, quarterly, both payable February 1, 1928, holders of record January 10.

## Officers

### Executive

**Charles E. Denney**, vice-president and general manager in charge of both operation and maintenance and traffic of the New York, Chicago & St. Louis, with headquarters at Cleveland, O., has been appointed vice-president in charge of operation of the Erie, with headquarters at New York, succeeding **William A. Baldwin**, who has asked for a year's leave of absence. A photograph and biographical sketch of Mr. Denney's railroad career appeared in the *Railway Age* of December 25, 1926, page 1282e.

**Herman J. Klein**, general manager of the Western district of the Erie, with headquarters at Youngstown, Ohio, has been elected vice-president in charge of operation of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio. A sketch of Mr. Klein's railway experience previous to his promotion to general manager of the Erie on February 15 appeared in the *Railway Age* of March 12, 1927, page 498. **J. W. Graham**, general traffic manager of the Nickel Plate, with headquarters at Cleveland, has been elected vice-president in charge of traffic, with headquarters at the same point. Mr. Klein and Mr. Graham succeed **C. E. Denney** who has been elected vice-president of the Erie in charge of operation and who occupied the position of vice-president and general manager in charge of both operation and maintenance and traffic.

### Financial, Legal and Accounting

**Edward S. Carr**, assistant land and tax agent of the Erie, with headquarters at Cleveland, O., has been appointed assistant secretary, with headquarters at New York.

**C. W. Crow** has been appointed auditor of the St. Louis & Hannibal, with headquarters at Hannibal, Mo., succeeding **A. P. Wilkinson**, who has resigned to accept service with another company.

### Traffic

**R. P. Sohan**, formerly connected with the traffic department of the Louisville & Nashville at Louisville, Ky., has been appointed general freight and passenger agent of the Frankfort & Cincinnati, with headquarters at Frankfort, Ky.

**A. E. Buchanan**, who has been appointed general passenger agent of the Eastern region of the Pennsylvania, with headquarters at Philadelphia, Pa., was born on September 30, 1871, at Philadelphia, and completed his education at the Philadelphia Manual Training School in 1888. He entered the serv-

ice of the Pennsylvania as a stenographer in the passenger department in March, 1890, and later served in various branches of the passenger traffic department. He was then placed in charge of the company's tourist bureau, and later was advanced to chief clerk to the general passenger agent. Mr. Buchanan was appointed chief clerk of the passenger department in 1907, and on October 1, 1908, was again advanced to divi-



A. E. Buchanan

sion ticket agent of the Eastern Pennsylvania division. When the passenger department was reorganized on March 1, 1913, Mr. Buchanan was appointed division passenger agent at Harrisburg, Pa., and on October 1, 1917 was transferred in the same capacity to Baltimore, Md. On November 1, 1920 he was again transferred as division passenger agent to Philadelphia and in August 1924, was appointed assistant general passenger agent at Philadelphia, which position he was holding at the time of his recent appointment as general passenger agent.

## Operating

**G. W. Kellogg** has been appointed superintendent of the Ogden Union Railway & Depot Company, with headquarters at Ogden, Utah, succeeding **H. L. Bell**, deceased.

**J. H. Skillern**, superintendent and master mechanic of the Graysonia, Nashville & Ashdown, with headquarters at Nashville, Ark., has been appointed assistant general manager, with the same headquarters.

**James B. O'Rear**, who until recently was engaged in colonization and development work in southern states, has been appointed general manager of the Frankfort & Cincinnati, with headquarters at Frankfort, Ky.

## Mechanical

**Norbert J. Friert**, passenger car foreman of the Erie, with headquarters at Buffalo, N. Y., has been appointed shop superintendent, with headquarters at

North Hawthorne, N. J., succeeding **John T. Munroe**, retired.

**C. James**, mechanical superintendent of the Eastern district of the Erie, with headquarters at Hornell, N. Y., has been appointed superintendent of motive power, with headquarters at New York, succeeding **W. S. Jackson**, resigned. **F. H. Murray**, master mechanic of the Western district, with headquarters at Cleveland, O., has been appointed mechanical superintendent at Hornell, succeeding Mr. James.

**D. C. Cossar**, locomotive foreman on the Alberta district of the Canadian Pacific at Medicine Hat, Alta., has been promoted to division master mechanic of the Brandon division, with headquarters at Brandon, Man. He succeeds **George Moth**, who has been transferred to the Portage division, with headquarters at Winnipeg, Man., replacing **A. M. West**, who has retired.

## Engineering, Maintenance of Way and Signaling

**C. F. W. Felt**, chief engineer of the Atchison, Topeka & Santa Fe system with headquarters at Chicago, has been granted a leave of absence and **G. W. Harris**, assistant chief engineer, with headquarters at Chicago, has been appointed acting chief engineer of the Santa Fe system.

**W. N. Hartman**, supervisor of telegraph and signals in the Central region of the Pennsylvania, with headquarters at Uniontown, Pa., has been appointed assistant signal engineer of the Chesapeake & Ohio, with headquarters at Richmond, Va., succeeding **C. A. Taylor**, assistant superintendent of signals, promoted. The position of assistant superintendent of signals has been abolished.

**H. W. Fenno**, division engineer on the lines of the New York Central west of Buffalo, with headquarters at Chicago, has been promoted to engineer of maintenance of way, with headquarters at Cleveland, Ohio, succeeding **Charles Yoder**, deceased. **F. J. Jerome**, trainmaster on the Western division, with headquarters at Chicago, has been appointed division engineer, replacing Mr. Fenno. Mr. Fenno was born on December 16, 1870, at Dorchester, Mass., and attended public school at Boston, Mass. At the age of 15 he entered the Lowell Institute at Boston, specializing in mechanical drafting and machine design for two years. Mr. Fenno obtained his first engineering experience during the summer of 1891 in the engineering department of the city of Boston and entered railway service in November of that year in the engineering department of the New York & New England (now a part of the New York, New Haven & Hartford), being engaged on preliminary and location survey on the line between South Norwalk, Conn., and New York. From January, 1893, to October, 1904, he served on the Boston & Albany, for the last two years of that period in charge of the office of the division en-

gineer as first assistant engineer and devoting a large part of his time to grade separation work. Mr. Fenno was then appointed chief draftsman and office engineer of the Lake Shore & Michigan Southern (now a part of the New York Central) and in May, 1906, he was promoted to resident engineer of the Eastern division, with headquarters at Dunkirk, N. Y., where he remained until February, 1913, when he was transferred to the Western division, with headquarters at Chicago. The Illinois division of the New York Central was added to his jurisdiction in March, 1916, and in 1917 Mr. Fenno was promoted to division engineer at Chicago, holding the latter position until his promotion to engineer of maintenance of way on November 1.

## Purchases and Stores

**G. K. Pitchford**, storekeeper of the Chesapeake & Ohio, with headquarters at Newport News, Va., has been transferred in the same capacity to Handley, W. Va. **S. Okrent**, storekeeper at Handley, W. Va., has been transferred as storekeeper to Newport News, Va.

## Obituary

**Charles B. Hoyt**, superintendent of track maintenance and construction of the Nickle Plate district of the New York, Chicago & St. Louis, with headquarters at Cleveland, O., until his retirement in August, 1924, died at his home at Bellevue, O., on November 4.

**Nelson H. La Fountain**, general supervisor of buildings of the Chicago, Milwaukee & St. Paul, died at his home in Chicago on November 3, following a four-day illness from heart trouble. At the time of his death Mr. La Fountain was more than 70 years of age and had served the Milwaukee for 46 years. He was born on September 23, 1857, at Plattsburg, N. Y., and after attending high school and business college and taking a course in night school architecture he became a carpenter's apprentice in 1876. Shortly thereafter he became a carpenter, entering railroad service in that capacity on the Chicago & North Western in 1880. Mr. La Fountain entered the service of the Milwaukee in 1881 as a building foreman and in 1885 became chief carpenter on the lines in South Dakota, and in 1887 chief carpenter on the lines in Wisconsin. In 1888 he acted for a short time as building inspector and in the same year he became chief carpenter on the Kansas City division where he remained until 1891 when he was promoted to assistant district carpenter. Five years later he was advanced to district carpenter, serving in this capacity at Marion, Iowa, and at Chicago until 1901 when he was promoted to assistant superintendent of bridges and buildings, with headquarters at Chicago. Mr. La Fountain was promoted to general supervisor of buildings, with headquarters at Chicago, in 1919, a position he held continuously until the time of his death.